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ACM Accused of Censorship

By Jeffry Beeler
CW West Coast Bureau

...e Association for Computing Machin... (ACM), which has long advocated free... ...of expression for scientists around the ...ld, now stands accused of censorship.

...e brouhaha erupted late last month ...n the 37,000-member society was ac... ...d of "censoring" two candidates' ballot ...ements for the association's upcoming ...tion of national officers.

...e accusations were made by present of... ...holders. They have accused the ACM ...ablishment" of trying to rig the election ...his effort.

The issue revolves around statements that each candidate for office is allowed to make on the ballots themselves and that also appear in *Communications of the ACM*, the group's technical journal.

Editing or Censoring?

Portions of the statements by presidential candidate Roger Mills and executive council member Dr. Herbert R. J. Grosch — now seeking another term — were deleted, and everyone agrees on that fact.

However, the people who deleted those portions claim that the statements were just edited, while others claim that unpopular views were censored.

Los Angeles Chapter Chairman Dahl Gerberick, for example, accused ACM's leadership of conspiring to "rig" the May 13 election when it deleted the controversial portions.

Grosch described the alleged ballot statement censoring as an effort by ACM's "establishment" to conceal its preelection bungling and to thwart candidates who seek to broaden the association's scope and liberalize its nominating procedures.

On the other side of the controversy, ACM's Vice-President Peter Denning —

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NEWSPAPER

COMPUTERWORLD

THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

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Software Maintenance Service Costs for Installed Decsystem-1090

As of May 1979		As of January 1980	
QHK02 Tops-10 Software Self-Maintenance Service	$4,000	QH649 Tops-10 Software Self-Maintenance Service	$2,462
Fortran	included	Fortran (QH500)	950
Cobol-68/74	included	Cobol-68/74 (QH099)	1,300
Basic 10	included	Basic 10 (QH503)	900
Algol	included	Algol (QH502)	750
Notebook Update Service (two copies)	included	Notebook Update Service (two copies)	1,118
Dispatch Subscription (two copies)	included	Dispatch Subscription (one copy)	included
		(one additional copy)	445
	$4,000		$7,925

The table above shows the annual prepayment cost of Digital Equipment Corp.'s Software Self-Maintenance Service plus "necessary" options for one Decsystem-10 installation. Under DEC's new policy, this user will pay about 98% more than he was spending for the same services under the earlier policy.

DEC Tops-10 Services Unbundled Quietly

By Marcy Rosenberg
CW Staff

MERRIMACK, N.H. — Decsystem-10 users will pay substantially more for post-warranty services offered under Digital Equipment Corp.'s Tops-10 Software Maintenance Service when their contracts expire.

DEC has quietly unbundled a number of post-warranty services for languages supported by Tops-10. In addition, DEC will no longer guarantee at least one new operating system version per service contract nor will it extend service, as it has in the past, to include new versions released after the termination date.

Although put into effect Jan. 1, the change in policy took some users by surprise; others were not informed until late March.

Former Policy

Before the policy change, DEC offered its Tops-10 Software Self-Maintenance Service (QHK02) for $4,000. For that annual prepayment fee, customers received the following:

- Automatic operating system updates on microfiche or hard copy.
- Operating system manuals and users' guides.
- Two copies of software notebook updates.
- Two subscriptions to the biweekly software dispatch, said to provide ongoing maintenance data in the form of software patches, programming notes,

(Continued on Page 8)

Inflation: Users Cutting Corners

By Brad Schultz
CW Staff

Many U.S. users' short-term response to inflation is to buy more packaged software and reduce the number of new hires, but most do not have long-term plans for coping with double-digit inflation, according to a user poll conducted by *Computerworld* last week.

However, most said they expect hardware prices to continue to fall, and most expect to have sufficient funds for further automation during years when DP overheads and the cost of borrowing money to meet those overheads may rise sharply.

Because of inflation, Blue Cross/Blue Shield of Mississippi will buy more canned software and will swap access to specific packages with other Blue Cross/Blue Shield organizations across the country, according to Clyde P. Ballard, DP vice-president of the Jackson, Miss.-based health insurer.

Ballard's organization, which runs 1.4G bytes of mass storage through a 1.5M-byte Honeywell, Inc. 66/60 mainframe, will also conserve software development personnel by writing software in collaboration with its affiliates.

Most of the polled managers agreed with Ballard that inflation impacts more heavily on the labor-intensive side of computing, especially programming and maintenance, than on equipment prices, which generally drop over the long haul because of innovations in technology.

Moreover, up to 90% of a typical DP budget is now allocated to labor-intensive functions, according to George J. Hess, management systems and planning director for Rockford, Ill.-based Ingersoll Milling Machine Co. That means inflation can easily offset the savings users derive through falling hardware prices, Hess noted.

For example, a user's budget would

(Continued on Page 6)

Amdahl, STC Plan to Join Forces

By Marcia Blumenthal
CW Staff

SUNNYVALE, Calif. — Amdahl Corp. and Storage Technology Corp. (STC) of Louisville, Colo., last week signed a letter of intent to merge their companies into a single new firm.

The intended merger will produce the only IBM plug-compatible manufacturer (PCM) capable of offering its customers complete systems made in-house, according to industry observers.

Final plans for the location and name of the new firm have not been determined, according to Amdahl Chairman and Chief Executive Officer Eugene R. White.

Although the firms were guarded on the terms of the merger, they did say Amdahl stockholders would receive one share of the new firm's stock for each Amdahl share. STC stockholders would receive three quarters of one share of the new company's stock for each share held.

Diversified Line

The new corporation will offer a more diversified product line with all the necessary system capability, support and service disciplines, White noted.

Until now, neither Amdahl nor STC, both significant factors in the IBM plug-compatible market, has been able to offer users total systems. The proposed merger is viewed by industry observers as a way of overcoming that market weakness.

"The merger is an absolutely beautiful fit," William Becklean, a vice-president with Bache Halsey Stuart Shields, Inc., said.

"The PCM business is not a long-term viable business," he maintained. PCMs are now building an

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If They Want to Advance

Chitchat Seen Vital for MIS Heads

By Jeffry Beeler
CW West Coast Bureau

SANTA MONICA, Calif. — If you're a management information services (MIS) manager who hates to engage in small talk with non-DP colleagues, you may be hurting your opportunities for career advancement, according to two University of Colorado authorities on employee motivation.

As individuals with an uncommonly strong drive to "get things done," MIS managers usually participate diligently in interdepartmental business meetings — as long as the discussions focus on matters of substance.

But as soon as the conferences degenerate into "chitchat" about trivial items like sports or the weather, MIS managers typically button their lips until the topic of conversation returns to business, Daniel Couger and Robert Zawacki said here recently at a two-day seminar on how to motivate DP personnel.

Signs of Disapproval

Some MIS managers are downright blunt in the ways they register their disapproval of on-the-job small talk. Couger and Zawacki cited examples of MIS managers who pointedly open their mail and read technical journals during interludes when interdepartmental meetings stray from their original purpose.

These unsubtle, nonverbal signs of displeasure are almost always intentional and are an MIS manager's way of telling his non-DP counterparts, "As long as you people stick to the assigned topics of discussion, I'll contribute to this meeting in every way I can, but the moment you start shooting the breeze, I'm going to turn my attention to more important matters."

In short, most MIS managers regard small talk during business hours as a waste of time, but is their attitude justified? Couger thinks not. Informal conversation, he said, gives DPers an opportunity to establish a rapport with their fellow department heads and thus aids them in "selling" their management ideas and promoting their careers.

An unwillingness to indulge occasionally in friendly banter at work and to seek social acceptance from their non-DP cohorts accounts, more than anything else, for the failure of most MIS managers to advance beyond their narrow technical specialties and win positions of top general management, Cougar explained.

Cultivating Camaraderie

To improve their chances of corporate advancement, MIS managers should work hard to cultivate a camaraderie with their management colleagues and upgrade their conversational skills by:

- Forcing themselves occasionally to join in their non-DP colleagues' chitchat.
- Occasionally calling interdepartmental meetings that are not absolutely necessary for business purposes.
- Regularly having informal lunches with their counterparts in other departments.

To explain why MIS managers typically take a dim view of on-the-job small talk, Couger and Zawacki reported the results of a recent survey in which they polled DPers to find out how, if at all, they differ from their colleagues in other disciplines.

The survey findings revealed that MIS managers are different from non-DPers in two important respects. First, they have a noticeably higher need to grow professionally and to seek opportunities that challenge their competence. Second, they have an exceptionally low need to interact with others on a purely social level.

That means MIS managers come to business meetings with vastly different expectations from, for example, marketing or sales executives.

Marketing and sales types, by contrast, tend to be much more outgoing and gregarious and often come to meetings as much to socialize as to do business, Cougar and Zawacki said.

Greyhound vs. IBM Delayed Until February

PHOENIX — A retrial of the Greyhound Computer Corp. vs. IBM antitrust case has been postponed again, this time until next February.

The retrial, ordered by the Ninth Circuit Court of Appeals in January 1978, was to have begun May 6, although that, too, was a delayed date.

Federal Judge William P. Copple met with lawyers for both sides late last month. He then ruled that Greyhound was not ready for trial, an IBM spokesman said.

The action dates back to July 1972. A federal court dismissed the suit at that time in favor of IBM after Greyhound had presented its case, but before IBM put on its defense. Greyhound appealed and subsequently was granted a retrial.

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Carter Wants to Phase Out Criminal Systems' Funder

By Jake Kirchner
CW Washington Bureau

WASHINGTON, D.C. — Development of state and municipal law enforcement computer systems, a real growth industry in the face of rising crime statistics, faces a serious setback in the Carter Administration's efforts to trim $15 billion from the 1981 federal budget.

Under the Administration's proposal, unveiled two weeks ago, the Justice Department's Law Enforcement Assistance Administration (LEAA) would be completely phased out. The original budget, sent to Congress earlier this year, had called for $571 million for LEAA.

In its 12-year existence, the agency has parceled out approximately $7 billion to states, which in turn directed millions of dollars to state and city governments to purchase computer hardware and establish sophisticated DP capabilities.

Under the Carter plan — backed by the Budget Committee of the House of Representatives — existing LEAA contracts would be honored, but no new funding agreements would be made.

Others Expected to Pay

The budget cuts are said to reflect Administration and congressional belief that state and local governments will pick up funding for those programs previously financed by LEAA grants if the programs are thought vital to local law enforcement efforts.

The House committee reportedly felt LEAA has fulfilled its original mandate to spur innovative approaches to crime control and that the agency was never intended to permanently support law enforcement programs.

As with all budget proposals, the final decision will be up to Congress, which historically has shown little inclination to trim outlays for law enforcement resources. But House Budget Committee support for the plan is seen by Justice Department insiders as the handwriting on the wall for the LEAA.

NCC Putting Zoom Lens On DP in Entertainment

By Bruce Hoard
CW Staff

ANAHEIM, Calif. — The National Computer Conference, which will be held here May 19-May 22, will feature five sessions dealing with computers in entertainment. Suzanne Landa is director of those sessions, and she thinks they are long overdue.

"The computer industry has never given recognition to this industry the way it has to insurance, banking and automotive," she said. "There are many significant things going on."

Landa noted that the Society of Motion Picture and Television Engineers devoted a full day to computers in entertainment at its conference last fall and conducted a series of seminars on the subject last year.

She also noted that 400 people turned out on a recent weekday evening to attend a session on the computer techniques used by Walt Disney Productions in "The Black Hole."

Moreover, one computer-based system won a technical achievement Academy Award at this year's ceremonies, and another was nominated. The winner was Access, a fully automated and computerized sound effects editing system developed by Mini-Micro Systems, Inc. Nominated was the Automatic Camera Effects System (Aces), developed by the Disney studios and first used in "The Black Hole."

Both systems will be discussed during an NCC session entitled "Computer Use for Special Effects in Movies and Television."

Other sessions will cover "Computers in Animation," "Computers in Amusement and Sporting Events," "Computer Support Behind the Scenes in Movie and Television Production," "Computers in the Performing Arts" and "Computer Use for Special Effects in Movies and Television."

Donn B. Tatum, chairman of the board of Walt Disney Productions, will address Wednesday's plenary session. He will talk about the uses to which Disney Studios has put computers and what its future plans are.

Disney Studios will also show film footage developed to demonstrate Aces before the Academy of Motion Picture Arts and Sciences.

The NCC computers in entertainment sessions will be "kicked off" at the Monday night all-conference reception, when Landa will screen a 20-minute film that takes a humorous look at the more than 50 movies that have used computer technology to date.

NCC is sponsored by the American Federation of Information Processing Societies, Inc. Housing forms and registration information are available from the federation at 1815 N. Lynn St., Arlington, Va. 22209.

Memorex Disk Units Get Bigger Price Tags

SANTA CLARA, Calif — Memorex Corp. has raised purchase and lease prices on its 3670, 3675 and 3652 disk storage products. Effective immediately the increases range up to 18% on certain models.

Specific equipment affected by the announcement includes Memorex's 100M-, 200M- and 635M-byte disk drives and associated controllers. These products attach to medium to large CPUs.

Memorex had announced general price increases on certain large storage systems products and maintenance last February, making this the second increase this year by the company.

The purchase price of the 200M-byte 3675 disk drive were increased to $54,290 from $46,090. The price of the 635M-byte 3652 disk drive rose to $57,024 from $53,050. There was no purchase price increase on the 100M-byte 3670 disk drive.

Twenty-four month lease prices rose to $1,365/mo from $1,277 for the 3670, to $1,949/mo from $1,823 for the 3675 and to $1,694/mo from $1,644 for the 3652. Maintenance prices were unaffected.

Reasons for Increase

Memorex attributed the latest price adjustment to continued inflationary factors, and to the higher cost of financing required to support the company's expanding worldwide manufacturing, marketing and service operations.

Memorex said its backlog on large storage systems products is in excess of four months' production and is continuing to increase. Contributing to this performance, the company said, were several large contracts signed recently, including a $30 million contract with the U.S. General Services Administration.

Memorex's worldwide revenues in 1979 totaled $738 million.

ACM Candidates Charge Censorship

(Continued from Page 1)

who is one of three candidates for president against Mills — defended the ballot statement deletions and dismissed as "nonsense" Grosch's accusations that the changes were meant to influence the election's outcome or cloak wrongdoing.

Denning refused to characterize the alteration of the ballot statements as "censorship" and instead referred to it as simple "editing." The deleted passages, he claimed, violated the association's policy prohibiting use of any ACM resource for "campaigning and electioneering."

Grosch, meanwhile, has asked his attorneys to seek an injunction against the "improper" ballot statements, the first of which are scheduled to be mailed this week. The former ACM president holds out little hope, however, that his injunction request will be granted.

Passages in Question

At issue in the censorship flap are two passages in Grosch's 200-word ballot statement and one brief passage in Mills' 500-word statement.

In Grosch's case, the ACM leadership blue-penciled an entire section urging voters to elect Dr. Portia Isaacson, not Denning, as ACM's next president. The leadership also removed a passage accusing the association of "botching" the nominations for national office, "subverting" the organization's petition process, "suppressing" unfavorable letters to one of the group's major publications and, in general, conducting a "scandalous" election.

In Mills' case, ACM let stand practically all the original ballot statement, but omitted a reference to Denning in a sentence that sought to clarify the two candidates' major policy differences.

Grosch interprets the alterations to his ballot statement as an attempt by ACM's "establishment" to cover up alleged election mismanagement and abuses, especially what he said are efforts to exclude from the national nominations any candidates not acceptable to the leadership. In particular, he pointed to an episode involving Kathleen Wagner, a candidate for ACM secretary, whose petition for nomination was originally rejected at ACM headquarters because it purportedly fell short of the required number of signatures.

When Wagner challenged her disqualification, she found a crucial number of her petition's signatures had been rejected as invalid for extremely picayune reasons, Grosch and Gerberick alleged.

Denning, for his part, rejected the inference that ulterior motives played a part in Wagner's initial disqualification, and he praised ACM's headquarters for "bending over backwards" to try to validate each of the candidates' petition signatures.

Grosch also interpreted the alteration of his ballot statement as a tactic to eliminate his reference to Isaacson, whose candidacy, he said, is viewed with alarm by the associations's establishment because her background as a DP "practitioner" would conflict with and probably threaten the ACM leadership's strong academic bias.

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House Cable TV Net to Carry Data, Facsimile

By Phil Hirsch
CW Washington Bureau

WASHINGTON, D.C. — One hundred years ago, the world's first demonstration of a new-fangled device called the telephone took place in the U.S. House of Representatives. What happened afterward is history.

Today, the House is preparing to play a similar role in the evolution of the on-line information society.

A cable TV network that now transmits pictures of legislative proceedings to the offices of House members and committees is likely to be converted this year into a broadband transmission pipe carrying data and facsimile in addition to TV. House officials are also looking into the possibility of adding videotex, a TV terminal-based interactive message system, to the cable network.

The cable provides a total of 32 two-way TV channels. "We plan to use up to four of them for data and facsimile," according to Ken Showalter, staff director of the House Policy Group On Information and Computers. This is the organization that oversees operation of the House of Representatives Information System (HRIS).

Besides the cable, HRIS includes about 550 data terminals connected by leased telephone circuits to an Amdahl Corp. 470V/5 central computer system. This network gives members and committees access to data bases showing the current status of pending bills and related information.

About 300 other terminals, linked directly to the long-distance telephone network, connect members with their home district offices and provide access to commercial information sources such as the New York Times Information Bank.

'Local Area Net'

These data terminals will be linked to the cable under the scheme proposed by the HRIS staff. The result would be a packet-switched digital, broadband "local area network," providing a minimum transmission speed of 1.2M bit/sec and a maximum of nearly 5M bit/sec.

Packetizing and depacketizing would be performed by a special bus interface unit (BIU), developed by Mitre Corp. Through the BIU, each terminal would interface with the cable.

Another novel feature of the network is the method of allocating transmission channels. Instead of employing complex, expensive control software to assign channels in advance, each terminal would contend with all the others whenever it had a message to send. If two or more terminals interfere with each other, each one would retransmit after a certain time interval.

The interval would be different for each terminal, to prevent the interference from occurring again.

The proposed cable network will also have a computer-based "gateway," through which data traffic can be exchanged with the long-distance telephone system and with the facilities of specialized terrestrial and satellite carriers.

Reduced Costs

The proposed system will also greatly improve the cost-effectiveness of the internal DP network — the one connecting member and committee offices with the Amdahl central computer. For example, it will eliminate the present charges for leased telephone circuits and modems. Response time will also be greatly reduced.

Most of the present terminals operate at 300 bit/sec. The BIU will enable them to send and receive data on the cable at 9,600 bit/sec, or possibly 19.2K bit/sec.

Meanwhile, use of packetized message formats and switching will reduce the transmission overhead now required to ACK/NAK individual message blocks and correct transmission errors.

Videotex Idea

The idea of adding videotex to the cable network is the brainchild of Rep. Charles Rose (D-N.C.), chairman of the House subcommittee that manages the HRIS. It is largely because of Rose that the House began computerizing nine years ago.

A major obstacle confronting commercial videotex developers is the high price of the TV terminal interface unit. If the House decides to install such a system, it could encourage others to do likewise.

A few months ago, Rose visited the Tandy Corp., which built the interface for Green Thumb, a government-funded videotex experiment now under way in Kentucky [CW, March 31].

As a result of this meeting, HRIS technicians are now studying the Green Thumb Box to see how it might be integrated into their proposed cable network.

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To Soften Inflation's Hard Knocks

Pad Long-Term Plans With Cash, Users Warned

By Brad Schultz
CW Staff

When the economy sours, DP managers should cushion their long-range growth plans with plenty of solid cash. Otherwise, they risk a flurry of hard knocks, according to independent management consultant Belden Menkus.

Inflation has complicated effects on the DP community, Menkus observed, because other trends, driven by technology, either work with or against inflation.

Hence, the user may get more for its money in the years ahead, despite what inflation does to society as a whole, or the user may get less for its money — for unexpected reasons.

Most users accept as an article of faith that hardware prices will continue dropping at a precipitous rate, Menkus noted. But that faith may shatter on two counts.

First, since inflation hurts computer vendors along with the rest of society, vendors may be forced to raise prices. In recent weeks, such companies as Data General Corp., Datapoint Corp., Digital Equipment Corp., Prime Computer, Inc., Memorex Corp. and Beehive International, Inc. have done so, citing inflation as the reason [CW, March 31].

Second, hardware figures to be a tiny portion of the typical DP budget in the years ahead, Menkus continued. Conversely, the great majority of DP dollars will go into personnel, programming, maintenance and other categories that are especially sensitive to inflation.

Realistic Plans

What should the user do? Long-range plans should state a commitment to funding at the inflated rates that may occur, Menkus advised. Those plans may be less glorious, but they will bear out as more realistic, the Middleville, N.J., consultant explained.

Further, users should anticipate more growth in DP salaries. Despite the 7% lid on annual salary growth advocated by President Carter, to which DP salaries on the whole held fairly close during the past year [CW, Dec. 10], some categories of DP professionals will be far more expensive to carry on payrolls than they are now, Menkus cautioned.

In light of this trend, DP managers should explore ways to conserve their dependence on high-priced talent. Alternatives include buying more software and developing fewer programs in-house and sharing valuable personnel with affiliated organizations.

Menkus suggested that a large corporation might decide to spin off its computer services department as a separate company that would sell services to the general user community rather than just to the corporation's other departments.

This tactic would allow a large user to keep expensive facilities on its premises that top management might otherwise divest should inflation diminish the user's ability to maintain all of its DP resources.

Users Cut Corners to Respond to Inflation

(Continued from Page 1)

increase at roughly an 18% annual rate if the 90% segment given to labor-intensive activities cost 20% more each year while the 10% segment given to hardware and supplies remained constant, Hess said. At 18% compounded annually, a budget doubles every 4.2 years.

Inflation actually enhances the savings users get from falling hardware prices because they buy less expensive gear with cheaper dollars, a San Francisco user noted. But inflation may force vendors to reverse the computer industry's legendary ability to halve prices every 10 years if climbing materials and labor costs make systems more expensive to produce and market, he added.

While computer devices cost less over time, supplies do not, Ballard observed. Mill strikes and raw materials shortages are two factors the paper industry has blamed for the steep ascent of hard-copy and batch input media prices. In other CW polls, users ranked supplies along with skilled worker salaries as the two most inflation-sensitive segments of their DP budgets [CW, Jan. 15, 1979].

Despite the 7% lid on annual salary hikes that President Carter announced 18 months ago [CW, Oct. 30, 1978], last week's poll found some users struggling to meet their DP payrolls and taking steps to lower their demand for hiring computer operators, data entry personnel, programmers and analysts.

Boston-based Stop & Shop Companies has narrowed its DP work schedules from a policy of three shifts through the weekdays and a fourth shift on weekends to essentially a two-shift week, according to information systems director James Kisthardt. Like Ballard's firm, Stop & Shop buys more software packages and develops less software in-house to cut its demand for development man-hours.

Until recently, the grocery chain bought a package only if jt offered 85% of the capabilities required for a given application, Kisthardt said. Now, the company requires 65% fulfillment of packages for its 7.5M-byte dual processor facility based on an IBM 370/158-1 and 158-3 under VM/CMS and VS1.

Public Sector

Inflation is less threatening to public sector DP departments than those in private companies, according to Gordon L. Harding, who runs Nevada's Central DP Authority, the service bureau for 70 Nevada agencies.

In that and other states, the government cannot suddenly cut funding for its DP authority to offset cost overruns in some other agency, Harding explained. In contrast, a corporation might kill a number of DP projects by abruptly diverting funds that were earmarked for its central DP unit.

Although inflation drives up the cost of DP man-hours, technological breakthroughs drive up the productive value generated by those man-hours, Harding pointed out. The administrator called enhanced productivity the "salvation" of his agency's facilities during the present economic conditions.

Time-Sharing Option

A much smaller user, Milton Hospital of Milton, Mass., has indexed its costs for accessing McDonnell-Douglas Automation, Inc.'s (McAuto) time-sharing services to the rate of inflation, according to David Taddeo, who manages the hospital's fiscal affairs.

"We are keyed to three different indicators of inflation and our [five-year contract] calls for the lowest of the three . . . to be allowed as a rate increase," Taddeo said.

This is not a typical McAuto deal, he said, but is the result of negotiations by seven Massachusetts hospitals, members of an inflation-hobbled industry, that found time-sharing the only way they could afford DP operations.

Since mid-size hospitals and other small users cannot afford in-house computer systems, they do not benefit directly from drops in hardware prices, Taddeo noted. "We lease our [peripheral] equipment from IBM. And that [cost is] going up with inflation."

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Insurer Errs By $1 Million

MIDDLETOWN, Va. — When Equitable Life Insurance Co. installed a new computerized accounting system in 1977, it gave Todd W. Towlen a boost in monthly benefit payments — from $32 to $32,000.

It took Equitable two and a half years to realize it had made a mistake. Then the company wanted the money back.

Towlen, in the meantime, had collected a little better than $1 million in benefits from his late father's insurance policy — at the rate of $32 per month, he would have accumulated $1,308.42.

Towlen had not spent any of the money and questioned Equitable's right to ask for it to be returned. The insurance vendor, in turn, sued him.

Equitable filed suit in Frederick County Circuit Court the week of March 25 asking that the contents of safety deposit boxes in nine local banks be frozen. The insurance company believed Towlen had the money stored in the safety deposit boxes.

At a hearing on the matter, Towlen agreed to turn over $1,027,000 to Equitable, but kept the accured interest. That suited Equitable, which said, "The matter has been resolved and the lawsuit terminated." No criminal charges were filed against Towlen, a spokesman added.

Equitable would not say anything about its computerized accounting system because spokesman said, the insurance company does not feel the error was mechanical. Instead, the company feels the problem was a human error caused by one of the data entry employees.

The fate of that employee is not known.

Viewdata Conference Pulls International Crowd

By Rex Malik
Special to CW

LONDON — Viewdata 80, the first international conference and associated exhibition, opened here the same week the British Post Office mounted a large advertising and publicity campaign for Prestel, the world's first viewdata service to go fully commercial.

Viewdata 80, held late last month, offered an international exhibition. The French, Canadians, Swedes, Japanese and some multinationals such as Dutch Philips and the U.S. International Telephone and Telegraph were all represented, many showing production versions of their receivers.

Prices seemed to start at about $1,870 for a 22-in. color television receiver equipped to receive teletext broadcasts and to query and receive data on the interactive Prestel public service.

This is a drop of $440 to $550 from the prices that were quoted only a couple of months ago, according to manufacturers. Meanwhile, Philips indicated it would soon introduce a 14-in. color receiver equipped for teletext and Prestel later this year priced at $1,320.

Speaking for the British Radio and Electrical Manufacturers Association — the industry trade association — at the opening of the conference, Lord Thorneycroft stated that 50,000 teletext-compatible sets were delivered last year and that 50,000 viewdata — known in the U.S. as videotex — and teletext capability receivers will be sold this year, adding to the more than 3,000 in use in the UK at the start of the year. Eventually, he said, all sets made in the UK will be teletext-compatible.

Peter Benton, managing director of telecommunications for the British Post Office, stated that 55% of private users involved in a free market trial wanted to keep their receivers to access Prestel on a paying basis, while 92% of business users indicated their intention to also keep their sets. "Sixty percent of the nation," he said, "will be able to connect to Prestel by a local call by the year's end."

For the government, David Mitchell, a member of Parliament and a junior minister at the Department of Industry, stated that his department is developing an in-house veiwdata system. It will be the first use of such technology in government anywhere.

Growing Interest Predicted

By Rex Malik
Special to CW

LONDON — "More than half of U.S. homes will be connected to cable TV by 1985, and 10% to 15% of these will have two-way capability," Dr. H. Hoyle of Quantum Science Corp. predicted at Viewdata 80 here recently.

Hoyle's remarks were based on a Quantum Science study of mass market electronic information and communications devices — estimated at $60 billion annually. Viewdata-type systems are only a small part of this market, he noted.

U.S. consumers are dissatisfied with TV programming, and viewdata-type services could ride in on the back of the dissatisfaction, he said, with education and entertainment the first services to fly.

The second most important category of services, according to a survey conducted with the study, is communications and information — and particularly in the field of medicine.

U.S. Course Different

Hoyle's speech was one of the high spots of a day in which two sessions were largely devoted to the development of Viewdata-type technology in the U.S. Another high spot was the presentation of a paper by W. Ciciora of Zenith Radio, who made it clear he does not expect U.S. and European development of Viewdata technology to follow each other.

He cited a number of reasons. First, few U.S. households rent their TVs; in the UK, however, more than 50% of the sets are rented.

Second, the U.S. TV market is far larger. The two biggest TV manufacturers both sell more sets per year than all manufacturers in the UK sell.

Videotex and teletext will fly in the USA only if demand is strong and the product is low in cost, Ciciora believes.

Large quantities and low cost go together, particularly because there is a clash between TV and Viewdata characteristics at the set design and manufacture level, a clash which would have to be resolved but take considerable financial and time investments to do. Hence the television manufacturers are unlikely to go ahead unless there is evidence of strong demand, he pointed out.

At the transmission level, the U.S. and Europe differ significantly, Ciciora noted. Europe has a collection of strong national broadcasting authorities and just as strong and centralized telecommunications authorities.

The U.S. has more than 1,000 UHF/VHF television transmitters, many with poor signals, and many telephone companies. This would inhibit U.S. development, he said.

As far as the manufacturer is concerned, the complexity of the decoder, too, has been underestimated, Ciciora said. Decoders would have to be made in cheap very large-scale integration (VLSI) versions.

Why do you think they call it a dump?

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Telenet Electronic Mail Service to Start July 14

By Phil Hirsch
CW Washington Bureau

NEW YORK — GTE Telenet Communications Corp. will launch a nationwide electronic mail service on July 14, it announced here last week. Called Telemail, the service will enable users to send, receive and file messages eletronically through a wide variety of data terminals and communicating word processors [CW, March 24].

Facsimile terminals, however, will not be supported by the initial service.

A key advantage of Telemail, according to John K. Peters, vice-president of advanced network services, is that it stores messages on-line. Thus, if the recipient is away or busy, the sender does not have to try again, as he frequently does when using the telephone.

"Three out of every four telephone calls go uncompleted on the first attempt," Peters pointed out.

Charges for Telemail consist of the following major elements:

- Access and transmission: If the customer dials up the Telemail network by phone, the charge is $13.25/hour during "prime time" (normal business hours) and $3/hour at other times. Alternatively, he can use Telenet's nationwide In-Wats circuits for $25/hour during prime time and $17/hour at other times. The prime time rates will be discounted up to 50% for high-volume users.
- Delivery: There is no separate charge for electronic mail box service, consisting of on-line message storage within the network and subsequent retrieval by the recipient. For "direct delivery," the charges are 5 cents per 1,000 characters if the message is delivered via dedicated circuit and 12 cents if a telephone circuit is used. TWX, Telex and Mailgram delivery costs range from $1.30 to $3.25 per 1,000 characters.
- On-line storage: One mil per day is charged per 2,000 characters. (The first three days' storage are free.)
- A monthly service charge: What Telenet calls a "customer account charge" costs $100, but this fee is waived if the customer is already a Telenet subscriber.

Less Expensive

According to Peters, it costs a typical company $8.83 each time one of its management executives makes a long distance telephone call and $5.12 for each local call, when the cost of the executive's time is included. Telemail, he said, will reduce these charges to $4.10.

Moreover, Telemail will provide a number of extra benefits — a written record, for example.

The service is also said to be less expensive than other conventional modes of business communications. The average cost of a memo, including the preparation time, is $6, according to Peters. A typical facsimile message costs $8.67.

Peters added that companies already using terminal-based electronic mail services have reported productivity gains averaging 8%. He asserted that Telemail will prove cost-effective in any company where it produces a 2% increase in productivity.

Asked how big such a company would have to be, he said a firm with nationwide sales, three or four regional offices and about $2 million in annual sales could profitably use Telemail.

Special Features

Telemail includes a number of special features. Step-by-step procedures for entering messages are displayed on input terminals having CRT or printer capabilities, and these procedures can be customized to meet individual requirements.

The system also offers a multiple addressing capability and permits stored messages to be accessed selectively. For example, the user can choose to retrieve only the "urgent" messages stored in his network file or those sent from a specific location.

Additional data base retrieval capability is one of several enhancements to Telemail planned by GTE Telenet in coming months, Peters said. He mentioned searching on the basis of keywords as one possibility.

Also, additional terminal support will be provided. By the end of this year, the Telenet network will interface with IBM 3270 and similar terminals. Later, interfaces for facsimile machines, intelligent copiers and micrographic equipment are planned.

"Eventually," he said, "Telemail will also accept and deliver voice messages, using store-and-forward techniques."

DEC Unbundles Post-Warranty Services

(Continued from Page 1)

documentation revisions and responses to "significant" software performance reports (SPR).

- SPR service, a mail-in support service through which customers can report to DEC any software problems or suggestions.
- Maintenance coverage, in the form of automatic updates, for the following "dependent" software: Fortran, Cobol-68/74, Basic-10 and Algol.

New Policy

Under the new policy, described in a letter received recently by a DEC customer, the vendor eliminated QHK02 and substituted a new Tops-10 Software Self-Maintenance Service priced at $2,462.

For that annual prepayment fee, users will still receive automatic operating system updates, system manuals and users' guides and SPRs, but that is where the similarity ends.

One difference is that the $2,462 price tag does not cover dependent software. Yearly costs for such coverage are now as follows:

- For Fortran, $950.
- For Cobol-68/74, $1,300.
- For Basic-10, $900.
- For Algol, $750.

The new policy also differs from QHK02 in that no notebook updates and only one software dispatch subscription (hard copy only) are included.

Customers will be required to pay $559 for each software notebook and $445 for each additional dispatch subscription. Previously, additional notebooks cost $550 each and additional dispatch subscriptions cost $440.

As the accompanying table illustrates, one Decsystem-10 user will pay $7,925 for what he used to receive for $4,000 — a 98% increase.

DEC could not be reached for comment by press time.

Amdahl, STC to Merge

(Continued from Page 1)

installed base, but to survive they must grow from supplying system components to providing complete systems including support and software.

Noting Amdahl's move in that direction, Becklean observed that in the past year Amdahl has invested significantly in the development of operating software so that it will not have to be overly dependent on IBM.

In commenting on the fit of the two firms, White noted that 60% of Amdahl's current installed base is configured with STC peripherals. Moreover, the two firms together will also be better able to anticipate and counteract competitive actions by IBM.

Product Range

Although the products of both companies are well matched, Amdahl only manufactures processors that compete with IBM's high-end 370/158, 168 and 30 series models. On the other hand, STC has a broader power range of peripheral products and recently announced plans to expand more seriously into medium-range disk and tape products [CW, March 10].

When asked whether STC's range of products may spur Amdahl to broaden its processor range, White said "it is a possibility."

The completion of the merger will be a relatively slow procedure and will probably not be finalized for four months. Both firms will hold their regular shareholders meetings on May 6. White said he expects the terms of the definitive merger agreement will be clearer after those meetings.

The two companies began negotiating last fall after each competed and failed to acquire Memorex Corp.

As currently planned, after the completion of the merger, STC Chairman and President Jesse I. Aweida would become the new firm's chairman and chief executive officer. White would become deputy chairman and John C. Lewis, now Amdahl's president, would become president and chief operating officer.

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Seminar: Meaningful Work, Job Interest Top Priorities In Boosting DP Productivity

By Jeffry Beeler
CW West Coast Bureau

SANTA MONICA, Calif. — DP managers could boost their departments' productivity significantly if they would only make a small effort to increase the meaningfulness and interest of their employees' jobs, two experts in personnel motivation said at a seminar here on March 27-28.

Computing-room staffers who consider their jobs important and stimulating perform at least 15% more efficiently than DPers who find their work boring and insignificant, according to Daniel Couger and Robert Zawacki, both with the University of Colorado.

DP managers should avoid making their subordinates' job duties excessively narrow or routine, Cougar and Zawacki advised during the seminar, which focused on techniques for motivating computing personnel. Otherwise, computer-room chiefs run the risk of creating a dull working environment for their staffs and sapping their employees of the motivation they need to improve their output.

Specialization's Impact

Unfortunately for many DP shops, the computing field's traditional emphasis on specialization has given rise to a "vast army of underemployed" programmers and analysts who produce much less than they could because their uninteresting and overly restricted job duties have stifled their incentive to excel, Zawacki said.

The answer to increased productivity lies in improved personnel motivation, but the extent of an employee's motivation depends much less on the size of his salary or benefit package than on the quality of the individual's job itself, the professor of management and organizational science explained.

The belief in work as an employee's prime job motivator challenges some widely accepted assumptions about what factors spur DPers to produce to their capacity. Conventional wisdom holds that worker job satisfaction leads to high productivity, but current evidence suggests just the opposite might be true — that high productivity leads to employee job satisfaction.

Extrinsic vs. Intrinsic

Couger and Zawacki divide personnel motivators into two broad classes: extrinsic and intrinsic. Extrinsic motivators refer to a job's external characteristics, not to the work itself, and typically include factors like working environment, pay, company policy and occupational security.

Employees are constantly comparing their work situations to those of their peers. If they feel shortchanged in any of the extrinsic motivators, they become deeply dissatisified, and resulting complaints detract from their productivity. Thus, no motivation can take place until a subordinate's pay and other extrinsic needs are brought into line with prevailing standards.

Subordinates expect their extrinsic needs to be met as a necessary condition of employment. As a result, meeting an employee's extrinsic needs does not lead to worker satisfaction and high motivation. It simply eliminates dissatisfaction and silences complaints, the two researchers explained.

True motivation stems from satisfaction not just of extrinsic needs, but of intrinsic needs as well. Intrinsic motivators refer to the characteristics of an employee's job itself and are measured by rating factors like the level of achievement, professional growth, recognition and career advancement a subordinate derives from work.

The higher an employee rates his job according to each of the intrinsic factors, the more likely it is that the individual will be motivated to perform at peak capacity. Thus, to spur subordinates to boost their productivity, DP managers should first tend to their staffs' extrinsic needs and then work hard to increase their employees' opportunities for job recognition, achievement, professional growth and the like, Couger and Zawacki said.

What to Do, DP Managers?

SANTA MONICA, Calif. — Say you're a DP manager and, after polling your staff, you find a high level of job dissatisfaction among your programmers, analysts and operations personnel. What do you do?

One possible answer lies in redesigning employees' jobs to enrich their content, improve motivation and increase staff productivity, attendees were told at a seminar here recently aimed at motivating computer personnel. Here is a list of steps you might follow to accomplish these goals:

- Organize a brief workshop to inform management of your project's goals and procedures.
- Invite employees to submit suggestions for improving their jobs at a series of two-hour brainstorming sessions. Make clear that the final authority for accepting or vetoing proposals rests with you. But make clear also that if you reject any suggestions, you will explain why.
- Tape-record the brainstorming sessions and distribute transcripts of the recordings to each participant.
- Assess the feasibility of each employee's proposal by forming an evaluation committee composed of both supervisors and non-supervisors.
- Obtain top management's approval of any proposed changes.
- Set priorities for the proposed changes and establish a timeable for their implementation.
- Gauge the impact of the implemented changes and inform employees of your findings through an in-house newsletter.
- Repeat the process periodically (in most cases, once every two years will do).

How to take the frustration out of COBOL programming

Are you tired of all the frustrating aspects of COBOL programming? Of being a month behind schedule with no end in sight? Of making six test runs and still being no closer to finding that bug? Of drawing program flowcharts *after* the coding is complete instead of having a program design that would help you code? Of having to adjust to last-minute specification changes...even minor ones...that wreak havoc on your code?

If so, then I'm convinced we can help. Because we now offer two books that can teach you how to avoid many of the problems you normally run into when you're coding, testing, and maintaining programs. I think these books will make you more confident of your ability to get programs done right and on time. And I know they'll give you more time to spend on the rewarding aspects of your job. In fact, I'm so sure you'll profit from our books, I'll let you try them for a month free of charge. If they don't help you out in your job, return them and forget the bill...no questions asked.

How these books can help

Both of the books are "cope books." They can't do away with system problems, unreasonable schedules, late specification changes, and the like. But they *can* teach you how to develop programs in a way that will minimize the impact these problems have on you and your programs.

For example, by properly designing your programs, even major changes in program specifications will have only minor effects on your programs. By adopting more effective methods of program documentation, you will have less trouble with program maintenance. By using better methods of design, coding, and testing, you will have fewer bugs when you start testing and they will be easier to find and correct. And by having better control over all phases of program development, from design to testing, you will have less chance of getting behind schedule.

What the books cover

The first book is a textbook called *Structured Programming for the COBOL Programmer*. Now don't be scared off by the word "structured" in the title. The book was developed by Paul Noll, a COBOL expert from industry, who's not much interested in programming theory...just in the way programming can be made more efficient and practical. So what this book does is present a complete system for developing COBOL programs...a system that includes workable methods of design, documentation, coding, and testing. You won't have to learn a new vocabulary or be overwhelmed by theory to use these methods. On the contrary, I think you'll be delighted by their straightforward simplicity. And at every step of the way, you'll see how these methods make it easier to avoid the problems that can negatively affect your programs...and your productivity.

The second book, *The Structured Programming Cookbook*, is a reference manual for the development of new programs. It gives standards and guidelines for all phases of structured program development. And it gives complete design, documentation, and coding for four major classes of business problems. These programs are designed to cut down the repetition in your programming efforts. When you develop an update program, for example, I think you'll find that you can use the structure chart, some module documentation, and even some of the COBOL code from the model update program in the cookbook. This frees you from the tedious aspects of program development and lets you concentrate on the more challenging aspects.

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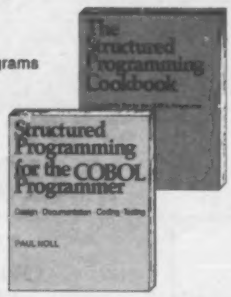
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Niosh to Launch Study Of CRTs' Impact on Vision

By Ann Dooley
CW Staff

BALTIMORE, Md. — Responding to continued concern over the possibility of CRT-induced health hazards, the National Institute for Occupational Safety and Health (Niosh) has agreed to examine if CRTs affect vision.

This marks the second major study on CRTs undertaken by Niosh in the last several months.

To be conducted at the Baltimore Sunpapers, a newspaper publishing group, this newest study will focus only on the ophthalmological effects of CRTs. The study was requested by the Sunpapers' unit of the Washington-Baltimore Newspaper Guild.

A Niosh study conducted earlier this year at the request of local and national employee groups took place at the *San Francisco Chronicle and Examiner*, the *Oakland* (Calif.) *Tribune* and the San Francisco Bay Area's Blue Cross offices. That study, whose results have not yet been released, was labeled the "most comprehensive" one ever undertaken [CW, Feb. 25].

Although both ergonomics factors and radiation hazard potentials were examined, the study did not include eye examinations to determine the purely visual problems of employees.

Study of Two Groups

A "walkthrough" survey of *The Baltimore Sun's* morning evening and Sunday sections was conducted in January by Dr. Shiro Tanaka of Niosh, who is heading the Sunpapers study. The study itself will probably not occur until early next year, but Tanaka is planning to meet soon with management and guild representatives to begin working out the details of the study.

The study will focus on two employee groups — one composed of people who work with CRTs on a full-time basis and one — the control group — composed of employees who have never used CRTs. Employees from several departments will be examined and hundreds of eye examinations will be made according to Tanaka.

Sunpapers officials maintain that similar tests already conducted by the Occupational Safety and Health Administration (Osha) and by a research team from John Hopkins Hospital failed to find any ill effects from CRT usage. But a recent employee survey showed a "high rate" of complaints concerning irritated eyes, blurred vision and headaches from those workers who used CRTs, according to Mary Knudson, Sunpapers medical writer and chairwoman of the Washington-Baltimore Newspaper Guild's Sunpapers health and technology committee.

In addition to the general eye complaints expressed by employees, one copy editor developed cataracts and a reporter was diagnosed as having a precataract condition. Both work with CRTs and both are younger than normal to develop cataracts, Knudson claimed.

The reporter's precataract condition was diagnosed by Dr. Milton Zaret, a New York ophthalmologist, according to Knudson. Several other ophthalmologists agreed with Zaret's diagnosis, but would not state what might have caused the condition.

Zaret was involved in another alleged CRT-caused cataract case several years ago when two copy editors at *The New York Times* developed cataracts [CW, Aug. 1, 1977]. However, no proof was found that CRTs related to the disease, and a Niosh study that grew out of the controversy could find no radiation danger from CRT use.

Employee groups, on the other hand, contend that *The N.Y. Times* study was not comprehensive enough and that is why they are now asking for furthur investigation.

CW Readers Asked to Help Curb 'Computerworldscam'

FRAMINGHAM, Mass. — Several *Computerworld* subscribers recently reported they were duped into an employment recruitment scam by people claiming to be employers of CW Communications, Inc.

According to the subscribers, the scam goes something like this: A DP manager receives a call from someone claiming to be from CW and offering free subscriptions to everyone in the DP department. All the DP manager has to do is turn over the names and titles of the people he wants to receive the free subscriptions.

A few days after turning over the names and titles, those people are contacted and in some cases offered jobs, by an employment recruitment agency which claims to have received the names from CW.

Computerworld has an entirely paid circulation and does not offer free subscriptions. Furthermore, it does not sell or rent lists of its subscribers to recruitment firms.

CW has requested that readers approached with such offers get as much information as possible from the person offering the free subscriptions or claiming to have a list of CW subscribers and send that information to Jack Edmonston, vice-president for research, CW Communications, Inc., 375 Cochituate Road, Rt. 30, Framingham, Mass. 01701.

Quebec Meet to Eye Graphics Technology

HULL, Quebec — A one-day seminar to familiarize decision makers with current and potential computer graphics technology is being sponsored by the Systems Research Division of Technetronic, Inc.

The seminar will be held on April 9, and again on April 10 here.

More information on "Computer Graphics: No Longer Just an Expensive Toy" is available from T.K. Dudley, Systems Research Division, Technetronic, Inc., Seventh Floor, Ottawa, Ont. K1N 7G2, Canada.

Budget Cuts Endanger Carter Privacy Program

By Jake Kirchner
CW Washington Bureau

WASHINGTON, D.C. — Although President Carter's recent State of the Union message committed the Administration to a concerted effort to safeguard personal privacy, the White House's proposed fiscal year 1981 budget, now before Congress, calls for substantial funding cutbacks for the government's privacy program staff.

The National Telecommunications and Information Administration (NTIA) office responsible for domestic privacy legislation and international privacy initiatives is facing a one-third reduction of its fiscal 1980 funding, which would result in an estimated 50% staff cut — from 12 persons to six.

Testifying against the budget cut before a House of Representatives appropriations subcommittee last Tuesday, Rep. Barry Goldwater Jr. (R-Calif.) noted the irony of cutting privacy funding at the very time the House is investigating ways to beef up government response to transborder data flow restrictions inherent in European national privacy legislation.

Calling the privacy program "vitally important," Goldwater, a member of the Privacy Protection Study Commission, said "the staff is there; the expertise is there. All that is needed is a commitment by the Congress."

The budget cut from $625,000 for the current fiscal year to $425,000 next year was proposed even before the latest Administration efforts to trim some $15 billion from the fiscal 1981 budget and has reportedly led to at least one resignation from the NTIA privacy staff already.

Washington Update

Contu Suggestions Introduced in House

Legislation to reaffirm that computer programs and data bases are copyrightable has been introduced in the House of Representatives.

The Computer Software Copyright Act of 1980, introduced March 26 by Rep. Robert Kastenmeier (D-Wis.), embodies the final recommendations of the National Commission on New Technological Uses of Copyrighted Works (Contu).

Kastenmeier is chairman of the House Judiciary Subcommittee on Courts, Civil Liberties and the Administration of Justice, which will be the first legislative body to consider the bill. The subcommittee has already scheduled several days of hearings on the legislation for the next few weeks.

The bill defines a "computer program" as "a set of statements or instructions to be used directly or indirectly in a computer in order to bring about a certain result." Copies or "adaptations" of programs could be made or sold "only with the authorization of the copyright owner."

Although the legislation does not specifically mention data bases, by repealing Section 117 of the Copyright Act of 1976 it would bring under the law any original works fixed in computer-sensible media, according to Bruce Lehman, chief counsel to the Kastenmeier subcommittee.

The legislation is "hopefully uncontroversial" in that it is only a "restatement of existing law," according to Lehman, who noted the Copyright Office already registers software.

Bill Would Monitor DP Sales to Soviets

A bill has been introduced in the U.S. Senate that would lead to increased congressional monitoring of technology sales to the Soviet Union.

The legislation, introduced March 28 by Sen. William Proxmire (D-Wis.), would require the Commerce Department to report quarterly to Congress on "each license to export or to reexport goods or technology to the Soviet Union."

Members of Congress have been critical of what some see as a lack of White House consultation with Congress on President Carter's decision to ban all exports of computers and other high-technology items to the Soviet Union following Russian military activity in Afghanistan.

In proposing the legislation, Proxmire noted that the present export administration law "does not provide a system for monitoring trade sanctions or for reporting to Congress on the results of the sanctions. My bill fills this gap."

Under the bill, the Department of Commerce would have to report to Congress any instances in which "export controls are reduced or exports licensed by reason of 'foreign availability.' " Currently U.S. firms are generally allowed to export items already available from other countries.

The Proxmire bill also calls for "an account of all actions taken to secure the cooperation of foreign countries" in curtailing exports to the Soviet Union and "an assessment of the economic effects of the [export] controls on the Union of Soviet Republics, including the effects on specific sectors of the economy as well as the overall impact."

Some representatives of the U.S. DP industry have been critical of the Administration efforts to restrict technology sales to the Soviet Union, arguing that the controls will result only in increased sales for U.S. allies and not substantially affect the Russian economy.

EFT Services Rescued By Congress' Action

A wide range of electronic funds transfer (EFT) services already offered by banking institutions but declared illegal by a U.S. court of appeals here last summer have been rescued by last-minute congressional action.

"Automatic fund transfers" between bank savings and checking accounts and the operation of "remote service units" by savings and loan associations were among services authorized by the Consumer Checking Account Equity Act of 1980, signed into law by President Carter last Monday.

Interim authorization for the services was scheduled to end the same day. The services were in limbo because of last year's court ruling that federally chartered banks, savings and loans and credit unions were providing the services outside existing law.

The new law permits commercial banks to continue offering automatic transfer accounts and authorizes banks and savings and loans to offer NOW accounts beginning Dec. 31.

In addition, the congressional action makes permanent the authority of federally chartered savings and loan associations to operate remote service units.

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Electro/80 Invitation To Soviets Rescinded

EL SEGUNDO, Calif. — Electro/80 has rescinded an invitation to a Soviet scientific group to attend the high-technology convention and exhibition in Boston May 13-15.

The group withdrew the invitation following the Institute of Electrical and Electronics Engineers' (IEEE) recent suspension of exchange programs with the Soviet Popov Society [CW, March 3]. IEEE is a sponsor of Electro/80.

Electro had invited the USSR State Committee for Science and Technology to send a delegation to the convention. Electro General Manager William C. Weber Jr. withdrew the invitation in a March 13 letter to the chief of the Soviet committee's foreign relations department, Dr. Eduard A. Aykazyan.

The IEEE's action was in protest against Soviet treatment of some dissident Russian scientists.

User Files 'Bait-and-Switch' Suit In Four-Year Battle With Univac

By Marguerite Zientara
CW Staff

BOSTON — Traffic and Distribution Services, Inc. (TDS) has filed suit in U.S. district court here against Univac charging that vendor with deceptive selling practices and with deliberately using "bait-and-switch" tactics.

Based in Burlington, Mass., TDS audits transportation bills for its clients as the bills apply to rates set forth by the Interstate Commerce Commission and other state regulatory commissions.

In 1976, according to the suit, TDS — which was then processing about 50,000 freight bills per month — leased four Univac 1710 keypunch machines from the vendor.

TDS' Charge

Shortly thereafter, TDS claimed, a Univac representative recommended TDS replace the existing data entry system with a Univac Cade 1900 system. The representative allegedly claimed the new system "would meet all of the present requirements of [TDS], but would be more cost-effective and efficient," according to the suit.

The representative said the Cade 1900 had sufficient memory to allow TDS to create one program with several subprograms — instead of individual programs — for its customers, which would result in "a substantial economic saving" for TDS, the suit said.

At a subsequent meeting, Univac claimed the Cade 1900 could handle up to 200,000 freight bills per month, the allegation stated. Based upon these claims, TDS said it entered into a lease agreement, only to find that the Cade 1900 could neither handle 200,000 bills per month nor process all TDS' clients under one program.

"As a result of this, [TDS] incurred substantial money damages represented in increased labor costs, in loss of productivity and in the performance of existing clients' requirements."

When TDS notified Univac of the problems it was having with the Cade 1900 system, Univac advised ordering "additional [memory] which . . . upon installation did not remedy the situation," according to the suit.

"Again, [TDS] protested to [Univac] concerning the inadequacies of the system and its failure to meet the needs of [TDS] in servicing its clientele," the suit claimed. Advised at that time to "make a substantial addition to the system," TDS then concluded Univac was using "bait-and-switch" selling tactics, the allegation continued.

Upgrades to the system entailed going from 2.2M bytes of disk memory to 8.8M bytes between 1976 and 1979, according to a TDS spokesman.

Lease Payments Withheld

Because of Univac's "flagrant material misrepresentations" and its "failure to remedy the deficiencies," the suit claimed, beginning in May 1979 TDS withheld lease payments "to compel [Univac] to remedy the deficiencies and put the system in the condition as originally represented."

Two weeks before the suit was filed, on Jan. 17, 1980, Univac indicated in a letter that it was unable to fix the system in its present configuration and suggested an upgrade to the Cade 1900/10 so a carrier code could be implemented, according to the suit.

TDS said the Jan. 17 letter "impliedly is an attempt by [Univac] to execute a new five-year lease on the system at approximately double the cost of the system in place."

Claiming losses in excess of $100,000, TDS asked the court to determine the amount of actual damages and also asked to be awarded double or triple damages.

Univac has denied the allegations of misrepresentation and "bait-and-switch" selling. In its "answer and counterclaims," Univac maintained that the written lease agreement was a final expression of an agreement between vendor and buyer and that any other "representations, commitments, writings, promises or other communications" between the two were invalid.

Univac maintained further that the lease agreement provided that no legal action arising out of the transaction could be brought "more than two years after the cause of action has accrued."

Stating that TDS violated the lease by withholding payment since May 1979, Univac alleged it has suffered damage in the amount of $10,112.15 and asked for an award in that amount, plus interest and legal expenses.

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IBM Expected to Decide Soon on X.25 Support

By Phil Hirsch
CW Washington Bureau

MIAMI BEACH, Fla. — Within the next two or three months, "IBM will announce whether it is going to support X.25, the international packet communications protocol, within the U.S.," according to Dr. Howard Frank, president of Network Analysis Corp., in Great Neck, N.Y. He made the prediction while discussing the future of integrated voice/data networks at a recent data communications conference here.

Frank believes integrated voice/data networks will evolve gradually during the '80s, but will not achieve full integration until about 1990. At that time, he expects the integrated network to consist essentially of broadband, digital transmission links interconnecting computer-based nodes, each interfaced on the user's side to one or more terminals and/or computers.

"Gateway" nodes will provide access to other networks, he said. Each node will perform switching, speed/code/protocol conversion, message storage and related functions. The network will accommodate voice, data, and facsimile transmission, as well as video teleconferencing in some cases. Among other enhancements, it will provide end-to-end error control and message accounting.

Voice Requirements

The demand for "new data-like voice requirements" — such as secure voice transmission, computer-generated voice response and voice message switching — is one factor encouraging the development of integrated networks, Frank explained.

These applications become practical only when a telephone conversation is translated from analog to digital format, so they give the carriers an incentive to digitize their networks. As digital voice transmission becomes more widespread, it makes network integration possible for more telecommunications users.

Voice message switching is likely to have "major near-term impact" on the pace of telephone network digitization, he added. The reason: it allows voice messages to be stored within the network, thereby eliminating the need for the calling party to try again if the called party is unavailable.

Because of rapidly emerging competition from store-and-forward electronic message services, AT&T and other telephone carriers face a growing need to provide voice message switching, Frank indicated.

Packet Switched Nets

Future integrated networks are likely to use packetized message formats and switching, so the development of packet terminal interfaces during the next few years is another key trend to watch, Frank said.

Today's packet nets offer a number of benefits — they provide access to more than 150 U.S. cities as well as several other countries, — but they have some shortcomings, too. For example, while support for IBM's widely used 3270 terminal and similar devices offered by other manufacturers is "becoming available," it will not be widespread "for several years."

That is why the upcoming IBM decision regarding X.25 support in the U.S. is significant. If IBM decides to market an X.25 interface here — it already provides such support in Canada and France — other U.S. terminal makers are likely to do the same, and the whole idea of packet-switched communications will become attractive to a substantially larger group of users.

Benefits of Integration

Integration of voice, data and facsimile into a common switching/transmission system saves money because it permits facilities to be shared, thereby reducing hardware/software costs. Network performance can also be improved, since there is an inverse relationship between the number of circuits in a network and the amount of traffic it can handle without creating excessive congestion.

In a 10-circuit network, Frank explained, if the user wants to be sure of getting a line 99 times out of 100 attempts, each circuit can be loaded up to no more than about 40% of its capacity. In a 20-circuit network, by comparison, each circuit can be loaded up to about 60% of capacity without increasing the frequency of busy signals.

Along with the benefits of networks integration, however, there are some drawbacks, Frank pointed out. Different applications may have widely differing techincal requirements — teletypewriter terminals need far less bandwidth than digital facsimile units, for example.

Often there are differences in the number of errors that can be tolerated and in message length. Speed, code, and protocol conversion may be required in some cases but not others, as well as temporary or longer term storage.

These differing requirements increase the complexity of designing, operating and maintaining an integrated network, particularly since adequately trained technicians are scarce.

Another problem is that data and voice communications are often managed by separated divisions within a company, and so proposals to integrate the two frequently create organizational conflicts.

"Don't integrate unless you're sure it can save money or add capability to your present data communications system," Frank said. The best way to get started, he added, is "to start small" by choosing a few applications which can share existing circuit facilities and to select applications which can be integrated with minimal hardware/software modification.

A typical "first step" involves using a group of leased telephone circuits during the day for voice communication, then employing them at night to transmit batch data traffic.

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Calendar

May 1, Bethesda, Md. — **Computer-Aided Thinking for Financial Executives.** Contact: STSC, Inc., 11 Clearbrook Road, Elmsford, N.Y. 10523. Also being held May 13 in San Francisco, May 20 in Paris and May 28-29 in London.

May 2, Philadelphia — **Quick Planning and Reporting System Seminar.** Contact: STSC, Inc., 11 Clearbrook Road, Elmsford, N.Y. 10523. Also being held May 12-13 in Houston.

May 5-7, Houston — **Introductory APL.** Contact: STSC, Inc., 11 Clearbrook Road, Elmsford, N.Y. 10523. Also being held May 5-7 in Paris and May 5-8 in New York.

May 6-8, Boston — **Expo 80 Computer & Office Systems.** Contact: The Conference Co., Inc., 60 Austin St., Newton, Mass. 02160.

May 8, White Plains, N.Y. — **Intermediate APL.** Contact: STSC, Inc., 11 Clearbrook Road, Elmsford, N.Y. 10523.

May 8, Houston — **Files and Formatting.** Contact: STSC, Inc., 11 Clearbrook Road, Elmsford, N.Y. 10523. Also being held May 8 in San Francisco and May 9 in New York.

May 8, White Plains, N.Y. — **Seminar on Materials Management Systems.** Contact: STSC, Inc., 11 Clearbrook Road, Elmsford, N.Y. 10523.

May 13-15, Los Angeles — **Advanced Data Base Course.** Contact: Eastern Technical Associates, Inc., 20 Wells Ave., Newton, Mass. 02159.

May 14, Raleigh, N.C. — **Automatic Control of Execution.** Contact: STSC, Inc., 11 Clearbrook Road, Elmsford, N.Y. 10523. Also being held May 20 in Detroit.

May 14-16, New York — **Tuning Up the Corporate DP Function: A Management Primer for the '80s.** Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

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May 15-16, Moline, Ill. — **Data Processing Management Association Region 8 Conference.** Contact: Smiley Courtney, U.S. Ameta Drxom-Pa, Rock Island, Ill. 61299.

May 15-17, Pittsburgh, Pa. — **American Society for Information Science (Asis) Meeting.** Contact: Asis, 1010 16 St. N.W., Washington, D.C. 20036.

May 15-17, Greensboro, N.C. — **Key to the '80s,** sponsored by the Data Processing Management Association Region 8. Contact: James W. Shelton, Burlington Industries, 3330 Friendly Ave., Greensboro, N.C. 27420.

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Academic Cliff-Hanger

Students Claim Programming Prize

KANSAS CITY, Mo. — Moments before the six-hour deadline expired in the Fourth Annual National Scholastic Programming Contest held here recently, a team of Washington University students submitted an untested program that proved to be the winning entry in the contest.

The program ran correctly on the first trial and St. Louis' Washington University edged out the leading competitors — Purdue University, Ohio State University and New York University — for the school's second win in as many years.

Last year, Washington University defeated defending champion MIT in the contest, regarded by some as the Olympics of computer programming.

The 1980 computer programming champions from Washington University are, clockwise from left, Nathan Schroeder, David Camp, Steven Karasek and Michael Zyda.

The winning team members are Steven. F. Karasek, team captain and coach, a first-year computer science graduate student from Omaha, Neb.; David J. Camp, a senior in computer science from Pine Lawn, Mo.; Nathan E. Schroeder, a junior majoring in mathematics and computer science from Clayton, Mo; and Michael J. Zyda, a fourth-year graduate student working on his docorate in computer science from Northridge, Calif.

Sponsored by the Association for Computing Machinery and by Upsilon Pi Epsilon Computer Science Honorary, the event took place at Rockhurst College here.

During the contest the students worked singly and in pairs to create programs that would:

- Determine whether a fourth point was inside or outside a triangle formed by three other points.
- Continue a coded sequence of characters.
- Match a string of letters to a pattern containing a "wild-card."
- Work out a program for answering questions put to a data base.

This year, as last year, the Washington University students were the only group of 21 competitors to correctly solve all four of the problems. The next three finishers correctly solved three.

DP Application Study Course Offered by IBM

WHITE PLAINS, N.Y. — IBM is offering an independent study course to help DPers construct and validate application development projects.

Called "Estimating Application Development Projects," the course is said to define the application development process and the management system necessary for making application estimates, along with a description of development products.

Guidelines for keeping project records and reviewing methods are course features, along with an exercise and example workbook/text.

The course takes 12 to 18 hours to complete and the workbook can be used for future reference, IBM said.

"Estimating Application Development Projects" is aimed at DP managers, development managers, project managers, project planners, team leaders, DP auditors and DP consultants. Prerequisites for the course are IBM's "Managing the Application Development Process" independent study program and its Project Reviews Package.

The course costs $195, with a 20% discount offered for 15 or more orders. Course orders can be placed through any IBM sales representative.

DP Manager Award Slated

WASHINGTON, D.C. — Nominations are being accepted through April 20 for the William T. Knox Outstanding Information Manager of the Year Award, to be presented for the first time at the Fourth Annual National Information Conference & Exposition here May 27-30.

The recipient of the award, named for the late director of the National Technical Information Service of the Department of Commerce, will be chosen by a panel of judges representing the information management profession.

The primary basis for making nominations will be to recognize excellence in organizing and utilizing information productions and services (including systems and networks), where the creative aspects concentrate on information content, not machines or technologies.

The award is sponsored by *The Information Manager* magazine and Associated Information Managers here, a project of the Information Industry Association. Nominations and supporting materials should be sent to Associated Information Managers, Suite 502, 316 Pennsylvania Ave. S.E., Washington, D.C. 20003.

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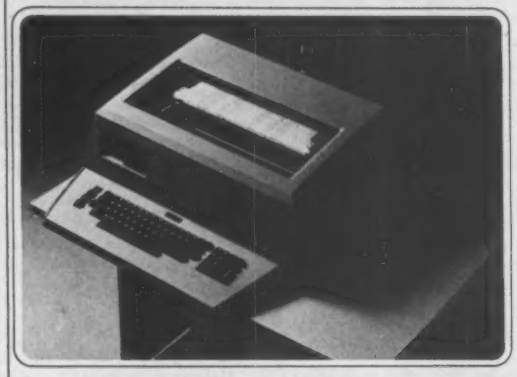

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Voice/Data/Fax Network Supporting Census

By Phil Hirsch
CW Washington Bureau

WASHINGTON, D.C. — Supporting last week's U.S. census is a nationwide voice/data/facsimile communications network that took 18 months to plan and will produce revenues of about $20 million for AT&T and associated telephone companies during the next several months.

The network includes 57 Digital Dataphone Service (DDS) circuits, each operating at 9,600 bit/sec. Some connect the Census Bureau's Suitland, Md., headquarters, near Washington, with three regional DP centers — in Jeffersonville, Ind., Laguna Niguel, Calif., and New Orleans; the others link these three centers with 12 regional Census Bureau offices.

The basic information flow is from district offices — there are 409 of these — to the regional offices, from there to the DP centers and, finally, to Suitland.

Besides DDS, the Census Bureau is employing 5,300 public telephone circuits plus the huge Federal Telecommunications System (FTS), a dedicated government telephone network.

Each of the 86 million census questionnaires mailed March 28 [CW, March 10] contains either a local telephone number or a toll-free 800 number that respondents can call if they need help. The Bell System has installed 45 telephone lines in each of 87 temporary offices, plus 60 to 70 lines in each of the 409 district offices; these circuits will be used to answer queries, make follow-up calls to households and handle other administrative messages.

First Phase of Analysis

The first phase of the census analysis operation consists of manually tabulating a few key items of information, such as the number of individuals in each household. This data is recorded on preprinted forms, then transmitted by facsimile using the FTS network to the regional centers and ultimately to Suitland.

The data is checked against projections made from the 1970 census and other controls to make sure that the proper number of forms has been received from each enumerations district. These preliminary counts are also shown to local government officials. Frequently, they have independently estimated the number of citizens living within their jurisdictions. Since the amount of money a community receives from the federal government usually depends heavily on its population, discrepancies between the two sets of figures could lead to bitter political controversies.

This first phase of the census enumeration is expected to end in August. In September, the detailed aggregation of census information should begin, which essentially consists of microfilming each form, then feeding the microfilm images into the Film Optical Scanning Device for Input Into Computer (Fosdic), a specially designed scanning device. A total of 12 Fosdics are installed at the Census Bureau's three remote DP centers; they connect via full-duplex, synchronous 9,600 bit/sec DDS circuits to the Census Bureau's main computer complex in Suitland.

At the latter point, a specially designed communications controller records the incoming information on 6,250 bit/in. IBM tape for later processing by the bureau's Univac 1100 computer system.

Fosdic reads only mark-sensed information, not writing or printing; that means it does not pick up a respondent's name, only his answers to census questions. This latter data, before being transmitted, is converted into a binary bit pack code that substantially increases the utilization of each DDS circuit.

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Europeans Restricting U.S. Firms

Eger Warns of Changing Data Flow Climate

By Brad Schultz
CW Staff

MIAMI BEACH, Fla. — By "awakening ancient fears," transborder data flow issues of the 1970s provoked several nations to severely limit the overseas DP of U.S. companies, hampering those firms' efforts to establish international branches.

While the U.S. lacks a policy on how computerized data should flow between nations, such policies function already in Europe and elsewhere, largely because foreign countries believe the U.S. computer industry damages their respective economies and because computer technology seems to jeopardize their citizens' privacy.

Those who manage data flows between foreign outposts and the headquarters of U.S. firms should therefore pay close attention to the world's changing legal climate, attorney John Eger told attendees at a recent conference here.

When companies try to bring foreign-compiled data home to the U.S., their DP managers may find that each source nation, in effect, requires such data to pass through its "customs" before the bit streams are transmitted or shipped on tapes beyond that nation's jurisdiction, Eger warned.

No country can inspect bit-by-bit all data that guest firms export, but governments want assurance that they can access outbound data from time to time as a means of selectively enforcing privacy laws, according to the former telecommunications adviser to Presidents Nixon and Ford.

Jobs at Issue

Aside from privacy and security concerns, several foreign nations frown on the brisk trade in timesharing and other DP services that the U.S. computer industry maintains with foreign-based companies. These services often compete with foreign-based service bureaus.

The problem basically comes down to the jobs foreign countries believe are lost to the U.S., Eger explained. A Canadian government report recently charged that Canada loses 35,000 jobs annually because U.S. service bureaus process Canadian data that otherwise would be processed by Canadian service bureaus, he said.

Centralized Authorities

For whatever reason, some 20 laws in several nations now confront DP managers of U.S. companies with overseas branches. Many of the laws have established centralized authorities that regulate those companies' data pipelines.

Under the centralized approach to regulation of transborder data flow, U.S. firms may need permission from the host nation before setting up computer-based files. Since guest companies generally need computer files in order to do any business, this sort of licensing effectively decides whether a U.S. firm can enter the nation, Eger pointed out.

Some European nations have denied U.S. firms licenses to establish files or export computerized data, the attorney noted. France barred Automatic Data Processing, Inc. (ADP) from offering services within its borders and, for much the same reasons, Sweden has effectively denied entrance to West German service bureaus, Eger said.

Undaunted by the French ban, ADP established a facility in Amsterdam that, through a "legal loophole," presently crunches French numbers. However, Eger added, France may soon fill that loophole.

No longer content to run its ministies' data through processors in the New York area, France, in concert with its state-owned postal, telephone and telegraph (PTT) monopoly, seems determined to freeze out U.S. DP vendors by placing a French-made terminal in every home and tying its businesses into one giant national data network.

Worried by West German as well as U.S. encroachment in its DP community, Sweden recently blocked Munich-based Siemens Corp. from exporting data used to determine staff promotions in the Swedish government, Eger said.

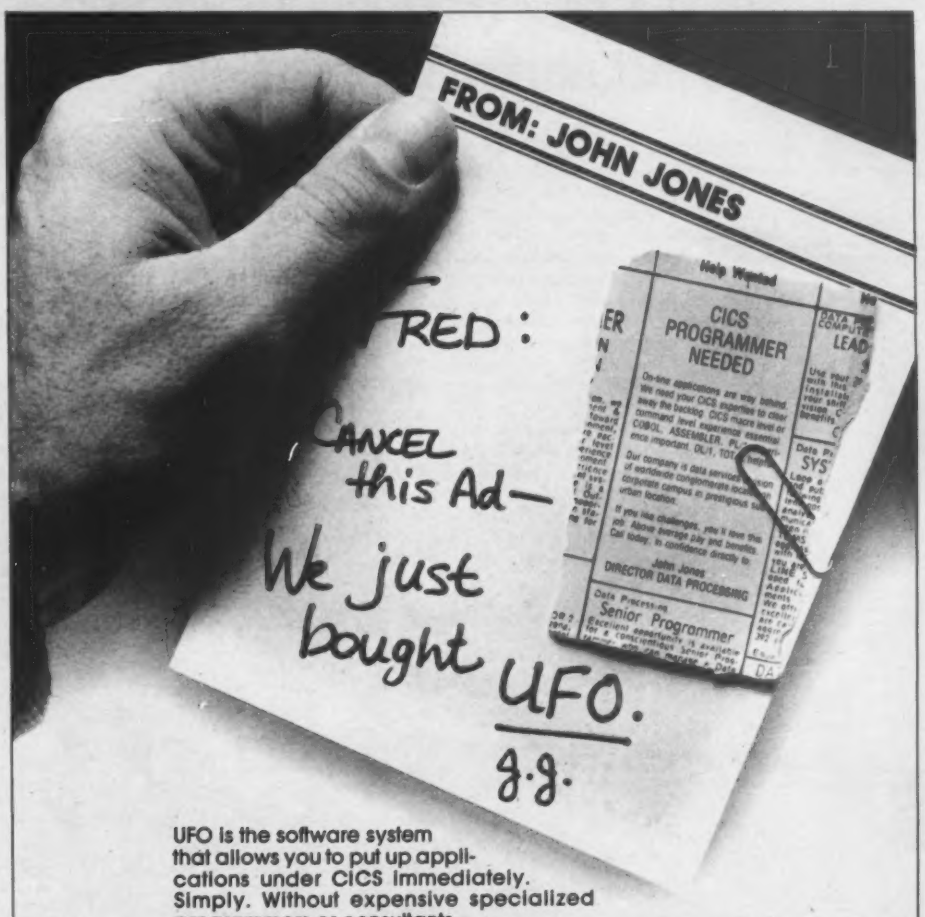
In general, laws regulating transborder data flow appeal to nationalist sentiments, he continued. Although privacy concerns may be the pretext for such regulation, the laws effectively serve as economic weapons — weapons that are trained on U.S.-based suppliers of computer hardware, software and services, he said.

DPMA Canada to Hear Talk on Women DPers

HALIFAX, Nova Scotia — New trends for women in DP in the '80s will be addressed by Denise L. Hassman, president of Women in Data Processing, Inc., here at a conference sponsored by the Data Processing Management Association (DPMA) of Canada.

The conference will be held June 11-13 at the Halifax Metro Center, with Hassman scheduled to speak June 13.

More information is available from Women in Data Processing, Inc., Suite 1511, 275 Madison Ave., New York, N.Y. 10016.



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Support for Data Flow Restrictions Strong

By Jake Kirchner
CW Washington Bureau

WASHINGTON, D.C. — A recent survey indicated strong support among government and business leaders around the world for restricting transborder data flows, a congressional subcommittee was told last month.

Reporting on a study by Transnational Data Reporting Service, Inc. (TDRS), G. Russell Pipe told the House of Representatives' Government Information and individual Rights Subcommittee on March 27 that transborder data flow is receiving increased attention from policymakers throughout the world.

The subcommittee has held several days of hearings on problems U.S. firms are encountering because of data flow restrictions and on U.S. government response to those problems.

Pipe, who resides in Europe, is TDRS president and a consultant on information policy and communications issues. The subcommittee asked him to provide an overview of European information flow policies.

According to Pipe, TDRS received 561 replies from 67 countries — fewer than 20% of which were from North America — to its opinion survey on international data flow issues. The responses, representing government, business, academia and other interests, showed that:

- Thirty-nine percent favor restricting foreign transmission of economic data, while another 39% oppose such curbs.
- Sixty-one percent of the respondents concur with the statement that "the absence of national capabilities to meet a country's data processing needs compromises its national sovereignty."
- Seventy-six percent think data communications policies should be a part of an overall government plan.
- "More than 50 %" agree that "companies should have the right to send to related companies located in another country any information they are allowed to use in their own country."
- According to 77%, government policies should help create a favorable environment for the growth of private-sector information service industries.
- Forty percent believe "national legislation will significantly reduce the growth of transborder flows of information."
- Only 11% favor taxing cross-border flows of information, although 24% were undecided on this question.

Pipe told the subcommittee the responses suggest that transborder data flow and related issues of native DP industry support, national sovereignty, unemployment and personal privacy will increasingly occupy important places on national social and economic policy agendas.

Symposium Set On Data Bases

McLEAN, Va. — The Honeywell Federal Systems Operation will host its second annual Washington Area Data Base Symposium here April 7-8.

Billed as a forum for presentations and discussion on the practical aspects of data base technology, the conference will feature about 20 speakers.

The registration fee is $150. More information is available from Mike Meyer at Honeywell, Inc., 7900 Westpark Drive, McLean, Va. 22102.

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To Stress Trade, Not Privacy

State Department Changes Data Flow Emphasis

By Jake Kirchner
CW Washington Bureau

WASHINGTON, D.C. — The State Department has decided to reorganize its structure for implementing U.S. policies on transborder data flow, the department official responsible for the issue announced recently.

Responsibility for State Department activities on data flow will be transferred from the department's science office to the Bureau of Economic and Business Affairs, according to Matthew Nimetz, under secretary for security assistance, science and technology. The reorganization reflects government awareness that transborder data flow is no longer only a matter of privacy laws and technology restrictions, but a subject of far-reaching trade barriers with major implications for U.S. balance of trade, he said.

Nimetz made the announcement during March 27 testimony before the House of Representatives Subcommittee on Government Information and Individual Rights. The subcommittee has been investigating U.S. government response to European national data protection laws and their restrictions on the information and telecommunications operations of U.S. multinational corporations [CW, March 17, 31].

'Uncoordinated and Unresponsive'

Subcommittee Chairman Rep. Richardson Preyer (D-N.C.) said in a statement released before the March 27 hearing that "the testimony we received in our first two days of hearings provided unsettling glimpses of a new set of protectionist tools which might be employed as barriers to international data flow.

"They are unique tools, combining traditional trade barriers, such as tariffs and technical standards requirements, with wholly new barriers, such as those possible through the misapplication of privacy and data protection laws."

DP industry witnesses had complained during the earlier hearings that the federal government does not have a mechanism for coordinating U.S. response to international data flow restrictions. Several suggested that the problem is more one of trade than of privacy and technology and that the office of the U.S. Special Trade Representative would be best equipped to represent U.S. interests in these matters.

Witnesses had also complained of lack of government assistance to companies trying to negotiate with foreign governments over the expansion of U.S. computer network services abroad. Preyer, in opening the March 27 hearing, agreed with that assessment, saying the subcommittee had found U.S. response to these problems "uncoordinated and unresponsive."

Just the First Step

Nimetz told the subcommittee the State Department is responding to those complaints by taking several steps "to improve the focus and responsiveness of our own organization." Transferring responsibility for the data flow issue to the economic and business bureau is just the first step, he added.

The department will also expand its liaison with U.S. business by strengthening its Working Group on Transborder Data Flows. The working group will meet soon to consider expanding its size and to "improve its agenda and strengthen departmental support," Nimetz said.

Subcommittee members expressed concern, however, that the State Department actions came only after the House began its investigation, and Nimetz was questioned closely about what Rep. M. Caldwell Butler (R.Va.) termed the department's "born-again awareness" of the data flow problem.

Nimetz replied that it has only been in the last year that American companies alerted the government to the problems they are facing with data flow restrictions. He noted that "American business usually does not come to the government when they're successful" and said data flow has become troublesome only recently.

Interagency Approach

Nimetz further suggested that now is not the time to turn the matter over entirely to the Special Trade Representative and defended the interagency approach to the matter that involves State, the National Telecommunications and Information Administration (NTIA) and the Federal Communications Commission (FCC), as well as other federal agencies.

Although national privacy and data protection laws are increasingly being used as trade barriers to U.S. businesses, the issue is still broader than trade, he said. The trade representative's office has a role to play, but he maintained it should not be the lead agency at this time, while the issue is still in the "formative stages."

U.S. response to the issue still requires the technical expertise of the NTIA and FCC as well as the negotiating authority of the State Department, according to Nimetz, who said it would not be wise at this stage to have one agency take over.

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'Catch' Helps N.Y. Police Nab Criminals Fast

By Ann Dooley
CW Staff

NEW YORK — To help catch criminals, New York City police are using Catch — Computer-Assisted Terminal Criminal Hunt — a system to help witnesses identify suspects quickly.

First implemented in the Bronx in September 1978, the system is now in use in all five boroughs of the city. When a suspect is arrested on a felony charge, a description of his physical characteristics is compiled together with particulars about his modus operandi (method of crime), address, aliases and a criminal code number which indicates where the suspect's photo can be found on a microfilm reader.

This information is transmitted via CRT terminals to a police department IBM 370/158. As many as 64 data elements are included as part of the description, and data on more than 200,000 known criminals are included in the data base, according to Sgt. William Stritzl, project coordinator.

The system can be used in several different ways to locate a suspect. For example, when a crime occurs, a victim is asked to provide a description of the suspect. That description is then run through the 370/158.

"The computer will cull out the number of people who fit the description and, using the identification number, we can go directly to the photo of the suspect or suspects to show the victim," Stritzl explained.

Instead of spending hours or even days looking through mug shots, the victim can choose from a limited number of suspects. Stritzl noted that the more photographs a victim examines, the less likely it becomes that a positive identification will be made; if Catch can narrow down the possibilities, it increases the chances of solving the crime.

Catch can also be used as a complaint data bank for unsolved crimes. When a suspect is arrested, his physical characteristics and other identifying information can be input to allow the system to search for suspects with similar characteristics from earlier reports of unsolved crimes.

If a "hit" is made, the photo of that suspect would be shown to the earlier victim. If the photo is positively identified, the suspect could be charged with both crimes, Stritzl noted. The system has only begun to function in this type of application, he indicated.

A crime pattern identification check could also be implemented in order to make composite descriptions of a suspect. For instance, if one person were committing a series of similar crimes, all the characteristics could be matched to provide a list of possible suspects. When a particular suspect is identified, the police can follow him and possibly catch him in the act.

"Right now we are still finding ways to massage the file in as many different ways as possible to get the most information in the most cost-effective way and use it most successfully to identify criminals," Stritzl said.

Identifications Up 44%

A six-month study in the Bronx, where the system was first introduced, showed that suspect identification increased 44% when victims used a combination of the Catch system and photographs of assailants.

But for the system to be most successful, a victim or witness must provide a good description of the suspect. Otherwise, Catch would cull out too many suspects for it to be effective, Stritzl said.

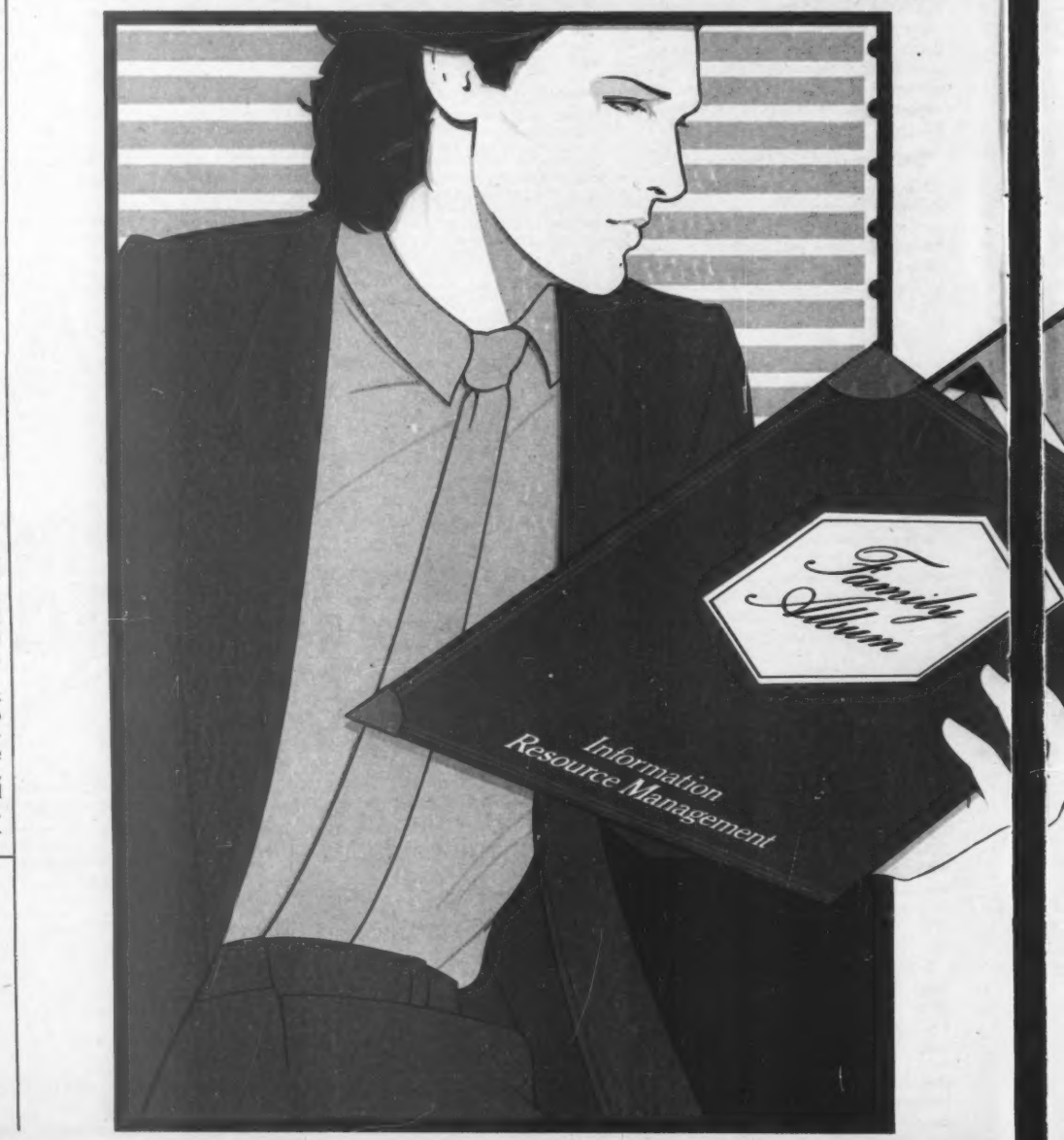
Identification of race and sex, for example, is usually not sufficient because the field would be too broad to be worthwhile. If a victim can describe a suspect's height, identifying marks or similar information, however, the system can select and discard until the smallest number of suspects is provided, he said.

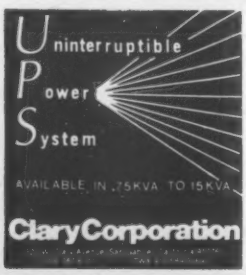
City police are instructed to obtain as much information as possible after a crime is committed so that a victim will remember important points. Police headquarters in each borough have several CRT terminals to access data from the 370/158 on-line.

Eventually, fingerprints may be incorporated into the system and police hope to someday cross-code all crimes by their modus operandi, making it possible to identify a criminal without needing the often vague physical description.

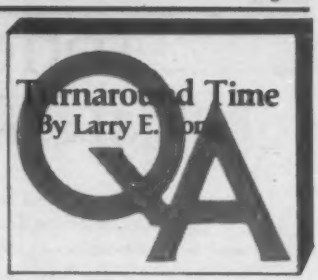
Catch represents the first time the city has used a computer for actual police work, rather than just using automated methods to access Federal Bureau of Investigation records or to compile reports, Stritzl stated.

The idea for Catch was first suggested in 1975 and the gathering of data was begun in 1976, but it took two years to build up a large enough file of criminals' descriptions to be of use. Without a large number of suspects to choose from, the system would be meaningless, Stritzl noted.





More DP Trouble Spots Pinpointed



This week's column is the second of two presenting reader responses on the problems and issues facing DP. Last week, we saw that *DP education* held the top spot followd by *rapid change in technology, DP management* and *personnel retention, Standards and procedures* and *documentation* were a distant five and six; however, if tallied together, as some respondents did, the combination would have topped DP education.

Several people wrote that an increase in the quality of DP management would have significant positive effects on many of the pressing problems in DP. The following is a representative quote: "Technical people are not always pleased with the idea of becoming a manager. They need to be shown the challenges of the management function, the rewards and the frustrations and how they should evaluate a potential management opportunity. Finding appropriate first-level managers for technical areas remains a continuing problem for our industry."

Also on DP management, one reader wrote: "Most of the skills we need to do our job are probably taught to us. Who teaches managers how to manage? Too many companies employ the 'sink or swim' approach.

"Since enough managers eventually swim, policy is rarely challenged, but it should be challenged. The improvement of management through specific education can lead to fewer drownings with advantages for all.

"Improved DP management must also lead to a wider view of business and just how it affects the DP department. DP managers must think like financial people, marketing people and support people if they are to be of maximum benefit to their organization. Formal education can help show managers how to change their perspective for everyone's benefit."

Another reader wrote, "Although I'm part of the DP management establishment, I'm having trouble convincing the other managers that DP management is a problem in our company. On the average, we retain our professional people for almost three years, and that's high for the area."

People stay with a particular company because they see career opportunities, enjoy their working environment, sense that they are needed and are adequately compensated (or can't find work elsewhere). The personnel retention problem is too readily accepted as a "given." It is a problem only because of lack of attention to the needs of employees.

DP professionals spend an enormous amount of time developing and improving systems for virtually every functional area in the company. Unfortunately, the systems within the DP environment are often neglected. The irony is that good DP systems which incorporate standards and procedures and documentation would improve the quality of all systems in the company.

A respondent stated, "If we had any interaction, it might be a problem, but since we don't, I guess user interaction isn't a problem."

Other Issues

The *privacy* and *security* issues were not mentioned often. As government regulations are tightened and as more corporations recognize their vulnerability, I would expect these two issues to climb close to the top during the next couple of years.

On the topic of *certification*, one reader noted that "because of the diversified backgrounds of DP professionals and the increasing critical nature of their job function, some type of certification is going to be necessary to be able to determine whether a person has the capabilities to do a particular job."

On *productivity*, a reader wrote, "An engineering rigor must find a place in the DP organization." Another noted that "the view that software costs must continue to rise each year must not be accepted as a law of nature."

One person didn't stop with three problems: "I must add a fourth to this list of problems — *company management*. They will not part with a dime for anything (not just DP) unless they absolutely have to. There will never be anything in the budget to clean up these critical problems until a major disaster or fraud brings the company to its knees, and I know I'm not the only one faced with *this* situation!"

Have a question? Send it to Larry Long, Editorial Department, Computerworld, 375 Cochituate Road, Rt. 30, Framingham, Mass.01701.

Long is a professor at Lehigh University, a DP consultant and author.

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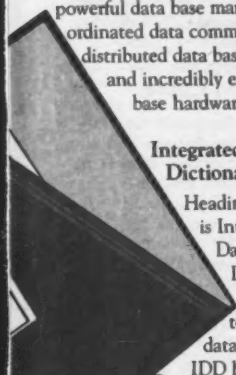

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EDITORIAL

The Red Death

DP managers should heed the moral of an Edgar Allen Poe story, "The Masque of the Red Death," as the nation's annual inflation rate tops 18%.

Poe's fable is set in a mythical land during the plague-stricken Middle Ages. Prince Prospero sealed his court and favored subjects within the impregnable walls of his castle in order to escape the Red Death, a plague that turned all it touched red and dead.

Do the nation's DP aristocrats think they have sealed themselves off from the ravages of inflation, which is leaving many firms in the red if not dead?

Prospero threw a masked ball to entertain his privileged guests. How many DP shops now revel in recent decisions to buy and develop computer resources without having carefully analyzed their ability to pay for that privilege in real dollars, amortized at interest rates that may be the highest in computing's history?

It will be interesting, but not pleasant, to watch the harsh reality of these contemporary economic conditions catch up with some brash young DP departments in this country.

Prospero's party was quite a bash in its early stages. However, the merriment stopped abruptly at midnight upon the appearance of a tall figure concealed by a blood-red shroud and masque — the accoutrements of the Red Death.

Likewise, how many users will halt their festive consumption of the new decentralized DP and integrated data/voice/word tools when their balance sheets show tall figures in red ink — the accoutrements of unchecked inflation?

Prospero was shocked to find the Red Death in his midst. He had thought his walls could withstand what menaced the common people of his realm.

During the past several years, many DP professionals have experienced major gains in remuneration and prestige within their respective organizations. Has this led them to believe they will not suffer from the economic devastations wrought on people in other lines of work?

The Red Death came to Prospero "like a thief in the night." That grim finale does not necessarily await most users. But to ensure survival, users should take steps to allow for double-digit inflation in their long-range growth plans.

If possible, users should subsidize their plans with enough cash to absorb the higher costs of computing that may come in the next few years, lest they be caught short — as if robbed by a thief in the night.

DATA PAST

Five Years Ago
April 2, 1975

A *Computerworld* survey reported that an overwhelming majority of readers were opposed to the proposal that DP personnel be licensed as professionals. In all, 72% of 1,535 ballots received voted against licensing, with only 15% in support of the proposal. The remaining 13% did not vote on licensing, but indicated the public needed some other form of protection from poor systems design.

Eight Years Ago
March 29, 1972

SAN FRANCISCO — IBM agreed to provide maintenance on its 360/30 CPUs, despite its earlier threats to withdraw such maintenance, on a "best efforts" basis as part of a "stipulated judgment" between it, Advanced Memory Systems, Inc. (AMS) and Itel Corp. that resolved the AMS and Itel antitrust suit against IBM. While the court settlement, entered in the U.S. District Court for the Northern District of California here, required IBM only to continue maintenance for users with AMS equipment, legal sources said IBM would probably have to extend the same treatment to users of other extended memory equipment.

— — —

SANTA CLARA, Calif. — The long-advocated concept of distributed processing was about to be realized in a small business-oriented system in the first Memorex Corp. series of computers. The MRX/40 and MRX/50 featured multiprocessor architecture, cycle times as fast as 800 nsec and hardware compatibility with all IBM peripherals. Shortly after this announcement, Memorex discontinued the manufacture of computer products.

LETTERS

Woman's Role

In reading *Computerworld* during the past year, I've noticed a rather subtle trend. Even though the data processing field has a high percentage of women in it, one develops a distinct impression from your periodical that this field is really a men's club.

The primary role women appear to play is a supporting, clerical one. This discrepancy is most obvious in the cartoons you select. Although you use several sources for these cartoons, each artist used sees the woman's role as either a data entry person or the wife of a DPer. As a data processing supervisor, I find this disconcerting.

The renewal of my subscription will fall due next month. Since I nevertheless find *Computerworld* to be valuable to myself and those that work with me, I will renew my subscription. However, I urge you to reconsider your policies on this manner.

Ann D. Heck
Supervisor
CAM Engineering
Hughes Aircraft Co.
Los Angeles, Calif.

'Clumsy Giant'

The Justice Department is so busy studying history that it is blind to current predatory practices of IBM. Why is it all the way back in 1965 instead of 1979?

IBM's aggressive pricing of the 4300 decimated many members of the plug-compatible market. This was all done under the cover of revolutionary technology. Once the dust settled, IBM raised the price.

What happened? Did the technology lose the revolution? Maybe victory could have been achieved if IBM had spent more money in the laboratory and less on public relations and tear-jerking commercials.

If we are to believe IBM's explanation that the initial price was an error, we must be even more convinced of its market power. Such a little mistake sent some large companies scrambling for life boats.

Something has got to be done to protect the market from the staggerings of a clumsy giant. Let's cut him up and leave none with those three hypnotic initials.

Edward C. Charbonnet
Memphis, Tenn.

The IBM Circle

The trend has been, and should continue to be, for corporations to lease rather than buy, to go short-term rather than long-term, and to explore the "secondary (used) market" for bargain short-term investing.

It's ironic, but the very uncertain, unexpected and cautious atmosphere that IBM itself has created has forced the DP consumer to take the very alternatives which have resulted in the cash problems IBM is experiencing.

The circle continues when, to maintain a demanding annual growth rate, IBM customers are again victimized by continued increases in the cost of maintaining their equipment.

However, an avenue of escape is again available as evident in the continued growth of the third-party maintenance organizations. IBM users can and are exercising their "time and material" options on the more dependable boxes in an effort to reduce costs.

My intent is not to criticize as successful a corporation as IBM, but more to express my wonderment as to why "Big Blue" makes it so hard to be a "Big Blue" customer!

Charles Ocerg
Boston, Mass.

Computerworld welcomes comments from its readers. Letters should be addressed to Editor, *Computerworld*, 375 Cochituate Road, Rt. 30, Framingham, Mass. 01701.

READER COMMENTARY/Wayne Douglas Bennett

Arguments Against Crime Bill Don't Hold Up

I am astounded by the apathy exhibited by the American Federation of Information Processing Societies, its constituent associations and the computing community in general in allowing the staffs of Senators Paul Laxalt (R-Nev.) and Orrin G. Hatch (R-Utah) to scuttle the Federal Computer Systems Protection Act (S. 240) by presenting a well-orchestrated charade purporting to pass as a Senate hearing ["Congress Told Computer Crime No Real Problem," CW, March 10].

For those who are unaware of S. 240's existence, the bill is intended to facilitate federal prosecution of computer fraud and abuse.

The Feb. 28 hearing was well attended except for the conspicuous absence of senators; none were present. The hearing was conducted by staff to Senators Laxalt and Hatch. Whether the people of Nevada and Utah feel adequately represented by staff members of whom they probably have never heard is beyond the scope of this discussion, which will address the arguments raised by the bill's detractors.

Four witnesses presented their opinions: two represented state prosecutorial interests (a state attorney general and the chairman of the National District Attorneys Association), another (an MIT professor) provided an unbiased look into the future of computing and the fourth is a programmer who represented himself. No one spoke in favor of the bill and, in the course of S. 240's funeral, many misconceptions were offered and not corrected.

The two attorneys were understandably (yet obliquely) attempting to reserve power to the states to prosecute what they perceive to be essentially local criminal activity (computer fraud and abuse). While the states certainly have the right to jealously guard the powers constitutionally reserved to them, that end does not justify the means used by the three witnesses taking positions (that is, excluding the professor) at the hearing.

Four Arguments

Four arguments are lodged against the bill's passage: (1) instruments of crime are not properly legislated against, (2) at least 40 federal statutes currently include within their collective scope every case of what is called computer crime, (3) computer crime is a "rare and insignificant problem" and (4) the bill is largely supported by a "gaggle of commercial firms that specialize in computer security" and others with similarly vested interests.

This last argument was not raised at the hearings, but because the programmer-witness, John Taber, chose to raise the issue in an interview for a *Computerworld* article on the hearings, I feel it should be addressed with the other arguments. Indeed, because this *ad hominem* argument is so despicable, it should be dealt with first.

For Taber's information, I do not stand to gain financially from passage of the bill. I daresay I do not want to be lumped in among the "purveyors of snake oil," as Taber described computer security firms. I am not so affiliated. Moreover, prior to the hearing, I wrote to Sen. Hatch, suggesting *changes* in the statutory language of S. 240.

Taber found the commercial interest of security firms in the bill's passage to be obvious. He even went on to name a prominent D.C. attorney who is supposedly affiliated with the same commercial interests. Has Taber checked to see whether that attorney also represents persons accused of computer crimes? If such defendants number among his clients, it would seem to be in his best interest to allow federal prosecutors to wallow amid their 40 or so statutes, looking for one that can be bootstrapped into the 20th Century to cover computer crime.

Indeed, what actually *is* the commercial interest that so sways these security firms to support this legislation? The interests of these firms seem more closely aligned with those of the criminals, without whom there would be little need for the aid of security advisors. A bill that facilitates prosecution and simplifies what would otherwise require 40 statutes cannot be in the commercial interest of those who

(Continued on Page 26)

READER COMMENTARY/Richard C. Cole

Management Should Ease Strain on Technicians

I read with interest the Reader Commentary "Why Has the Revolution failed?" [CW, March 3], in which the author took the technical community to task for not accepting better structured approaches of design and programming.

Certainly the comments were appropriate. The lack of response of technical people is not surprising, however, considering the environment in the vast majority of DP installations today.

- The computer is bought (or sold) to solve some *operational* problem. In addition, it is bought before management has any clear picture of how big or small the problem is.
- A DP manager and technicians are then told to solve the problem(s) in a predetermined time frame which has little or no correlation to the task and may be set at the direction of the vendor (who has a vested stake in this).
- User management allows itself to believe that the task of implementing the computer system (or additional systems) can be handled primarily by the technicians. Millions of dollars of constant hype by vendors and salesmen, as well as management's wish for the task to be done by someone else, lead inevitably to this conclusion.

Disappintment Waiting

The stage is now set for mass disappointment for the parties involved, except the hardware vendor.

After one, two or three years, management becomes aware that it has spent an enormous amount of money with little to show for it.

In addition, a wall of misunderstanding and suspicion has been constructed between the technical department and other employees.

Information which "should" be easily available from the computer is not. It isn't timely, it isn't attainable in a reasonable time frame and it certainly is not inexpensive.

The technician has not been idle in this scenario. First, he probably has been told what computer had *already* been ordered by management. Then he was given deadlines by which to accomplish predefined tasks.

In trying to accomplish these tasks with antiquated tools (flowcharting, Cobol, Fortran and so forth), he had to make several compromises. He had to spend as little time as possible with the user to determine the extent of the problem, promised unrealistic completion dates and worked 14- to 18-hour days accomplishing vague, undefined tasks.

Needless to say, in such an environment it is extremely difficult to produce an alert technician with a sense of having done a good job. Quite to the contrary, can you think of a more undesirable environment in which to do your life's work?

The user does not know where he is going and the technician has to aid and abet his getting there only to compelete most tasks in a much longer period of time than was projected and at a cost enormously larger than management anticipated. Even the ever-expanding salaries technicians receive do not compensate for such a stressful environment.

Change in Attitude

To change this situation will take more than new tools. It requires a change in the way the whole problem

(Continued on Page 28)

READER COMMENTARY/Louis J. Menendez

Department 'Wars' Can Be Cooled Off

A recent commentary, "War and Peace in the DP Department" [CW, Feb. 11], itemized some common conflicts between areas of DP. These are not new problems, and perhaps we have come to accept them as inevitable. However, there are ways to at least ease the tensions between the groups.

The first conflict dealt with the DP manager trying to get status reports and documentation from systems programmers. Truly, reports and documentation are difficult to pry out of any programmer.

An excellent solution to this problem is the program librarian, developed as part of the chief programmer team concept. The librarian does the formalization and standardization of the documentation; the programmer is asked only to supply the necessary facts. Status reports can be prepared the same way. The closer a shop comes to using the team approach, the freer the programmers become from the documentation effort.

Programmer Battles

The second conflict discussed was between application programmers and systems programmers. On those occasions when dumps require an in-depth knowledge of the information available, the application programmer must turn to systems for help. To systems programmers, these problems offer little challenge and have low priority.

The problem results from a trend away from technical education for application programmers. Their job is to translate user needs into some high-level, computer-digestible language. The need for knowledge of the internals has been minimized. Thus, when a problem develops requiring such knowledge, the programmers are untrained and unable to solve it.

Management must find a way to bridge this knowledge gap. One solution is to designate a specialist — a systems programmer who concentrates on compilers, their problems and the intricacies of their dumps. In concentrating on this specialized area, he will be able to offer suggestions to maximize the use of the compilers as well as solve the occasional difficult problems.

The final conflict discussed was between programmers and operations. The programmer needs test time for an urgent request; the operator must meet the production schedule. Neither has the authority to compromise his deadline. Neither has the proper perspective to judge the relative importance of any individual job.

Ideally, a person or team should evaluate the relative priorities of all the work when resources become tight. A decision can then be made as to how to assign those resources for the best results.

Minimally, the programmers should be aware of the limitations placed on operators and should be given alternative, realistic methods to acquire extra resources when needed.

There are other solutions to these problems, and perhaps other problems are more important. However, the point is that these three common conflicts can be eased by effective management.

Much is now being written about the need for effective management in DP for the decade ahead. These common internal conflicts indicate how real this need is.

Menendez is a systems analyst for Information Industries, Inc. in Kansas City, Mo.

LETTERS

Clarifying Two Criticisms

In *Computerworld*'s welcome coverage of the continuing debate over the Federal Computer Systems Protection Act, the March 10 article cited the opposition of the National District Attorneys Association (NDAA) and quoted from John K. Taber, a California programmer who apparently regards computer crime as a bogus issue being pumped up by mercenary consultants and underemployed prosecutors.

As a line prosecutor myself, I think a bit of clarification might help: the two criticisms are not the same.

As I read the article, the NDAA is opposed to S.40 not because computer crime is a myth, but because the local district attorneys who are their constituency can handle it. They see no reason why U.S. attorneys should preempt the field, and neither do I.

But Taber is opposed because he believes that computer crime can be adequately handled with existing laws. That is quite a different basis for opposition and a view from the bleachers with which those of us who are on the field must disagree.

It really comes down to what the community regards as adequate. Your district attorney is expected to prosecute wrongdoing and can only do so under existing statutes. We have this thing about ex post facto laws, and we cannot prosecute unless an act was labeled a crime before it happened.

Most statutes simply did not anticipate the mode of theft, either in respect to technique or form of loss, which the computer has made possible.

The Supreme Court of Alberta is presently wrestling with the legal question whether a student's unauthorized access to the computer system at his university three years ago could fairly be prosecuted as the fraudulent use of a telecommunications facility as defined by Canadian law. There is no question that he took what was not his to take. The question is whether the way he did it had been posted as a crime. Three years.

The Jones decisions in the federal courts of Maryland disagreed whether deceiving a computer into issuing a check to a phony creditor was a fraud or a forgery and went back to statutes of the first Queen Elizabeth to resolve the question. While the U.S. attorney was vindicated in his assessment, the victim spent considerable time waiting for our legal process to decide if we could handle it.

Right here in River City we have had several such crimes, and until our perceptive California legislature prohibited computer crimes, we district attorneys routinely required victims to translate their losses into terms comprehensible to Sir Walter Scott before we could proceed: their cost, not ours.

Could there be a parallel here? Every systems analyst I have met knows that computerization changes previous structures to effect greater service. To the extent that the structure of our justice system is intended to perform the expeditious resolution of alleged wrongdoing, recognition of computers as potential instruments of crime is not only necessary but historically proper.

Nor should CW readers feel concern that the push for such recognition is coming from outside their profession. Architects are generally mum on burglaries, and I do not recall that the weapons industry initiated the laws against armed robbery.

District attorneys do not want to regulate computers — we have murderers vying for our attention — but when computers are used for crime, we would be doing less than the job we were hired for not to get involved.

Don Ingraham
Senior Trial Deputy
District Attorney
Alameda County

Oakland, Calif.

On 'Loops, Foundations'

I enjoyed very much the In Depth article "Loops and Firm Foundations" [CW, Feb. 18]. Roger House very ably laid out the muddle of loops and resolved it very well.

I would like to suggest that the connection of *while* with pretest and *until* with posttest conditions is not traceable to Pascal (a relatively recent language) but to the English-language assumptions that the conjunction *while* refers to an event already happening (initially true condition), while *until* refers to one yet to happen (initially false condition). Propagation of this assumption to programming languages led to the confusion described in the article.

I did, however, dislike the last section.

This is partly because of my confusion at the lack of any END code to separate modules and at the similarity between "READ-FILE-A" and "READ FILE-A." (Another good programming practice is the use of non-confusing identifiers.)

But after using a tenuous argument to isolate the READ in one module, House then propagated calls to that module. And, he redefined the RECORD-LOOP module so that (unless PERFORM . . . UNTIL is actually an UNTIL . . . DO, in violation of the rest of the paper) the "cleaned-up" code will *not* function properly if the input file is empty.

On both of the author's own counts, the old code wins and the new loses.

Argument passing and value-returning functions are, I believe, constructs essential to structured programming. If these and a WHILE . . . PERFORM structure are available, then the code can read:

```
WHILE READ-FILE (FILE-A, BUFFER)
  PERFORM RECORD-LOOP (BUFFER).
LOGICAL FUNCTION READ-FILE (FILE, RECORD).
    READ FILE INTO RECORD AT END
    RETURN FALSE.
    RETURN TRUE.
END MODULE READ-FILE.
FUNCTION RECORD-FILE (RECORD).
    process record.
END MODULE RECORD-LOOP.
```

This code is truly structured: Each module does one thing, does it well and tells the others only what they need to know.

I close by noting that, since C and similar languages have a "*while* (condition) statement" construct, a "*do* statement *while* (condition);" construct and text macro definition capability, one can define *until*(c) to be *while*(*not*(c)), giving both UNTIL constructs. (I have also defined *unless*(c) to be *if* (*not*(c).)

Joseph S. D. Yao

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THE TAYLOR REPORT Alan Taylor

How to Handle Unreasonable Contracts

Many people sign contracts — often for good reason — that are unreasonable in some respect: they don't define the product clearly, don't provide firm delivery and ownership rights or quite clearly and effectively nullify *any* vendor responsibility in these regards.

Since this is a common experience, DP management should direct its attention to handling the situation that arises when such contracts are offered or signed.

Unreasonable contracts should be handled with quite specific and open reference to technical and legal rules. The aim of the whole exercise, after all, is to get the best value available.

Even the worst system has some value, if we take the time to find it out. Problems arise when we discard and ignore the open warnings in the unreasonable contract that the contract isn't going to do our work for us.

The manager should draw up a list of possible dangers to guard against, and he should set up a reassurance schedule. Delivery promises, for instance, can be reconfirmed every month until the last three months and then every week after that.

Before Signing . . .

A number of standard contracts just don't describe the product and indeed go further and disown the product descriptions. Technically this makes some amount of sense in both software and hardware cases. Products aren't the same all the time, particularly with microcode changes which are now normally expected to occur constantly, even during maintenance.

So, let us assume a contract offer for an undefined product that you want to buy anyway. What should a DP manager do to nullify his bad position?

Clearly, the manager should carefully inspect the product and try to see whether it fits his understanding of the contract description. His assessment must be documented in records kept in the ordinary course of business. (That's part of the legal side; all it means is that someone should make such documentation part of standard procedures. It can give important advantages in later negotiations against the unreasonable terms.)

In particular, what should be sought and documented is what the vendor says about the product, any reasons the vendor gives for why and how it might change, why the contract terms are as they are and what other people such as users or consultants report differently about the product.

For instance, the current dispute as to whether the IBM 4341 is in fact more than 22 times more powerful or less than 11 times more powerful than a 370/115 may not be able to be determined, but your IBM salesman's reaction and responses to the claims are facts that can and should be carefully recorded.

At the time of the contract, all this documentation should be gathered together, and at least one unaltered copy of it should be kept. At the same time, both the documentation and the contract (including any of the related hidden contracts such as universal agreements, maintenance agreements and so forth) should be searched for key places where future rights can be lost. For example, a provision might require that suit be brought within a short time — perhaps one year.

The manager should draw up a list of possible dangers that must be guarded against, and he should set up a reassurance schedule. Delivery promises, for instance, can be reconfirmed every month until the last three months and then every week after that.

Having made the schedule (and pointed out that it is necessary because of the contract's unreasonableness), the manager should document the schedule and the responses to it. Telephone call responses are OK if documented at the time; you don't have to go to a lot of bother. Secretaries or assistants can do the work, too.

If there is a disadvantageous change before delivery, you should again get the supplier's reason. It may help later, and it can't hurt.

When Problems Are Possible

You may be able to win some points simply by being a squeaky wheel, but in other cases you need to let the vendor people know that you appreciate the strength of the contract but are not frightened by it.

If the squeaky wheel approach doesn't work, then is the time to let the vendor know about the documentation you have. Use a courteous, non-threatening approach unless your negotiator thinks threats are appropriate and justified under the law.

The attorney doesn't have to lead; and he doesn't have to be there all the time. He does have to make it known that as a result of the contract, you have been taking precautions and have not been underestimating the vendor.

Those records of vendor statements both before and after the contract may show some false statements, innocent or otherwise. While the contract may try to cut them out, apparently false statements, recorded privately but properly, are the type of fuel an attorney needs to light a fire where it does most good.

An unreasonable contract does not have to be totally rejected or signed and treated as if it were absolutely satisfactory. You can acknowledge that it is unreasonable, yet still may be the best available. Then work at keeping the DPers, management and the vendor giving you the best that is available.

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PRIME Computer

Critics of Crime Bill Must Be Answered

(Continued from Page 23)

profit from the complexity of the field.

The argument that instruments of computer crime are not properly legislated against is particularly pernicious. The idea is that if people steal money or defraud others and use a computer in the process, the real crimes are theft and fraud, not unauthorized use of a computer.

Of course, the same argument holds with respect to the federal mail fraud and wire fraud statutes. At root, it is a jurisdictional argument. That is, fraud (except against the federal government) is essentially a local matter. Only when such facilities of interstate commerce as mail and wire are introduced into the crime does a justifiable interest of the federal government arise.

Some might say that Congress uses the interstate commerce clause of the Constitution to meddle in local affairs. However, these statutes have not been repealed by Congress, not struck down in the courts. Could it be that the free flow of commerce depends, in part, on the integrity of the facilities of interstate commerce such as the mail and communications lines? Perhaps these mere instruments make fraud and other crimes easier to commit and get away with on a *national* scale.

Perhaps computers do precisely the same thing. The growing dependence of interstate commerce on computers is indisputable. Perhaps a statute is required to clarify just what kinds of computer uses are to be classified as abuses.

As with mail and wire fraud, the person defrauded in a computer fraud is (at least) one step removed from the perpetrator of the fraud. Instead of proving that a criminal misrepresented, the prosecutor must establish how the criminal caused a fact to be misrepresented and then how the victim came to rely on the misrepresentation that was caused to be made via computer. The proof problems could become enormous. Are statutes which go to the instruments of crime analytically deficient in some way?

tion over which we have some (albeit theoretical) control (government) or whether we will instead let that power default into the hands of those who are free to do with it what they please. As any good programmer knows, sometimes the default values can kill you.

Once the Big Brother prong of the argument is removed, a simple argument against wasteful duplication remains with respect to the argument regarding the 40 federal statutes. Imagine the audacity of those commercially interested security firms — trying to buttonhole a quorum of senators long enough to have them legislate! Think of the time these senators will waste voting on the bill. Think of the law clerks who will be deprived of their livelihoods once a straightforward law is passed that might obviate the need to sort through 40 criminal statutes. What exactly is it about mere duplication that so rankles the bill's detractors?

We are told that criminal code reform is coming. It is spoken of in terms that

'. . . A malevolent Big Brother is likely to arise — one who will abuse the vast storehouse of information. The question is whether we will confer this power to abuse on an institution over which we have some (albeit theoretical) control (government) or whether we will instead let that power default into the hands of those who are free to do with it what they please.'

Orwellian Spectre?

As to the argument that the collective scope of 40 or so statutes supposedly includes all computer crime, the purpose of the argument eludes me. First of all, the list of 40 statutes undoubtedly includes the same mail and wire fraud statutes that share S. 240's federalism infirmities.

But the argument suffers from more serious disabilities. The thrust seems to be that we, as citizens, are already plagued with too many statutes, that this statute is unnecessary, that it expands federal jurisdiction unnecessarily and that as a result of this statute the federal government will have access to vast data bases whose contents will undoubtedly be abused. It will be an Orwellian future, indeed, if we allow the federal government to become Big Brother even before 1984 arrives.

The problem with raising the Orwellian spectre is that it presupposes that passage of S. 240 actually adds something to federal power. The bill's detractors cannot have it both ways. If S. 240 expands federal power, its scope cannot be a subset of the already extant 40 statutes. Two contradictory arguments are really used here.

As to the Big Brother argument, undoubtedly the details of our lives are increasingly finding their way onto disk packs. This is occurring independently from the fate of S. 240. Thus, the knowledge required to take advantage of innocent people on a large scale is currently being sorted and indexed on computer systems in both the public and private sectors. Given this state of facts, a malevolent Big Brother is likely to arise — one who will abuse this vast storehouse of information.

The question is whether we will confer this power to abuse on an institu-

would lead the listener to believe that the need for further criminal justice legislation will somehow vanish, including the need for S. 240. I doubt it.

The final argument raised is that computer crime is a rare and insignificant problem. As proof, the detractors usually point to the fact that there are very few reports of computer crime and none that have not been handled by current federal criminal laws.

If you had control over a large organization whose computer housed sensitive information (perhaps internal or perhaps relating to clients), how quickly would you call the police if security were breached? It would probably depend upon a comparison of the damage caused by the crime vs. the damage to be caused by revealing the crime. Moreover, much of the damage caused by the crime itself might not be suffered by your organization. The real victims might be the clients about whom information has been compromised.

Thus, reliance on the absence of reported crime is not particularly wise, even if it is assumed that all such crime is discovered at the computer site.

Similarly, the assertion that no crimes have surfaced in the press in which prosecutors have been unable to prosecute under current criminal statutes is another ambiguous statement from which conclusions should be drawn carefully, if at all. Is this statement the result of an investigation (or even a poll) of all prosecutors with respect to all the cases they did *not* bring for lack of a statute?

Suppose, for a moment, that all organizations report crime, whether or not it is in their best financial interest to do so, and that all prosecutors always prosecute, whether or not they have an appropriate statute. Under such a state of affairs, it might be reasonable to conclude that a lack of reported com-

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READER COMMENTARY/Michele Landon

Data Bases Not Ultimate Answer

The organization of data once it leaves the filing clerk's cabinet has progressed from sequential card and tape files to sequential or direct-access disk files to the creation of data bases with their multitude of complexities.

Cards were vulnerable to being dropped, torn or bent, and though tapes were more durable, they too were limited to sequential access. Disk files could be accessed sequentially or by a variety of direct methods, but they had limitations. Only one program could run against them at a time or one program could inadvertently overlay fields that need not have been accessed at all.

Then came data bases. They allowed for sequential or direct access. Multiple programs could run against them simultaneously. They provided a method of allowing different programs to use the same file but only perform the functions on the fields each actually used. As a result, much data duplication was eliminated.

Data bases seemed to be the ultimate answer. Along with this final file organization came the concept of corporate data bases and corporate data dictionaries to keep track of each data element.

Corporate Data Bases

There are, however, some minor problems with data bases and there are some major problems with the concept of corporate data bases.

The complexity of data bases makes the design and creation of files and access of data much more difficult than with regular IBM OS or DOS files. Gathering data for reporting purposes — a major function of data processing — now requires a highly skilled programmer.

Further, with all its security features, the data is not absolutely unaccessible by programmers. Data bases can be unloaded and dumped. Abends can occur and in certain circumstances the core dump may contain sensitive data.

Corporate data bases and data dictionaries have even more inherent problems. A large and complex system is required to relate all data elements of a company. The skills needed to understand and maintain these structures with their logical and physical relationships leads to specialization by some — data base administrators — and isolation of the major group of programmers from the actual nature of their files. The systems they design and write will also suffer some of this isolation.

The main problem with the corporate data base concept is the effect it will have on the design of new systems. In the past, files have been designed to suit the programs and needs of the system. In the case of corporate data bases, the new file structure will have to fit the existing one and the programs and system may very well have to be designed to fit the data base.

The history of data organization has been one of progress to new methods, and older ones have been maintained where applicable. However, in this case we have tended to turn inward, looking to expand the data bases into huge conglomerate networks.

I suggest that data bases are not the ultimate answer, that we should not let the data base design dictate the future of our systems and that we should be aware of their deficiencies and look toward the next stage of development of data organization.

Landon is technical unit supervisor of the Commercial Lines Automated Divison at Hartford Insurance Group in Hartford, Conn.

Arguments Don't Hold Up

(Continued from Page 26)

puter crime and a lack of reported prosecutorial failure indicates no *current* need for S. 240.

The result flowing from this conclusion is that *if* computers are ever used to commit crimes, the computing community would like to leave the application of current law to computer crime in the hands of the judges who hear the first such cases. Once the proof problems are sorted out, there will exist by necessity a de facto meaning for all of the computer terminology currently defined in S. 240.

It will, of course, be much more haphazard. Not all judges are familiar with the niceties of DP. The computing community may not be asked to step in and clear up the confusion when some local judge in East Mudslide is forced to make new law.

Of course, we can wait until this happens and, once the need arises, pass a new law. Programmers should, however, be especially sensitive to the problems caused by having to maintain a poorly designed system. Ideas become fixed, people become immovable and irreparable damage is sometimes done before the bugs are even found.

The last line of defense must be that it is theoretically impossible for a crime to be committed by computer wherein the application of current law would be anything but straightforward. In that case, lawmakers will have wasted a few hours passing a superfluous law.

But, at least, if the computing community wakes up in time, we will have been able to help define the ethical standards for computer use. Rest assured that *some* standards will be established even without our input.

The Senate Judiciary Committee has been told that computers are nothing more than giant filing cabinets that are accessed electronically, instead of manually. These same people who reduce DP to such an oversimplification testified that today's operating systems are capable of repelling all but the most expert intruders and that, therefore, S. 240 is not needed.

Are these the impressions that the computing community wishes to leave with Congress?

Bennett is a computer scientist, a law student and a former editorial staff member of the American Criminal Law Review. He lives in Sterling, Va.

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Technicians' Lot Should Be Improved

(Continued from Page 23)

of computerizing is addressed. A change of attitude on the part of management is the prime ingredient in the recipe for change in the field of DP. A first and most necessary step is for all key user personnel to take some management training (*not* furnished by a vendor of hardware or software) that is not only informative, but reduces the anxiety level of management about what it really takes to harness the computer.

The anxiety level produced by an improper understanding of the task results in unrealistic expectations which, in turn, lead to the stressful environment described earlier. Appropriate training will help alleviate this anxiety. The training should focus on defining corporate objectives, determining real information needs, planning and systems design.

At this point in the process, the user will be able to determine more accurately the following:

- The best software to solve the problem (appropriate language, package and/or custom software).
- The type of hardware that best suits the task (if a first-time user.)
- The probable expense of the solution and the risks as well as the benefits that might be anticipated.
- The probable time span and personnel requirements to do the job on time and within budget.

Why Not in DP?

The emphasis here is on education, understanding, goal-setting, management of resources and creating an environment conducive to success. This is done in other areas of business; why hasn't it also been applied in DP? Because the solution (computer or software) has been bought *before* the problems are fully comprehended by management.

Unquestionably, better technical work will help, but not a great deal if management does not finally recognize the enormous size of the problem and the correspondingly large amount of money it will cost if the present direction is not changed. The payoff is control of one's own business and access to information in time to make more relevant business decisions.

We are well-advised to use structured approaches in planning, design and programming. And nonprocedural languages with integrated data bases and easily understood (by users) command interfaces are a necessity if we are to minimize the distance between the user and the information the computer can furnish.

We have taken 25 years to get where we are with computers. That is a very short time. Now we must get the word to the user: Do not even think of the hardware or software until you have defined your own objectives and information needs. This is not an easy task because the user is beset on every side by hype and offers of free seminars (conducted by vendors!). The users alone control the buying cycle.

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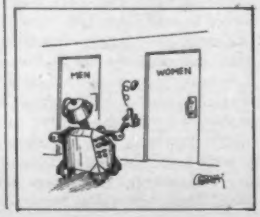
The vendors, meanwhile, can have successful referrals and can focus on improving their products even further.

Cole is president of Computer Results, Inc. in Pasadena, Calif.



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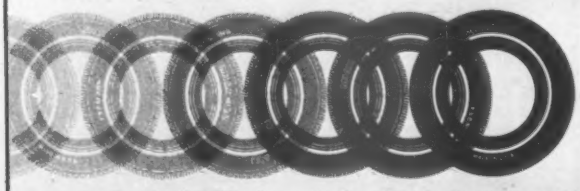

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DP Project Estimating — Part 1

Effective Estimating Process Outlined

By John Sanders
Special to CW

Just as effective planning forms the backbone of good management, so can estimating make — or break — a DP development project.

Without an effective planning methodology, plans are conceived hit or miss and fail to close the gaps between where you are and where you intend to be.

Similarly, without an effective estimating process, estimates are often prepared in a futile, crisis-oriented climate. The result: you will work harder at failing but, as someone once said, "you will sink on time."

A more fruitful tack, then, is to strive for an effective *process* for estimating, rather than to unsystematically scramble time after time to make estimates. The components of an effective estimating process are the following:

- Develop a system life cycle/work breakdown structure.
- Use a phase-limited approach.
- Set estimating guidelines for each "deliverable" unit.
- Use common sense and good judgment.
- Define influencing variables.
- Do consistent reporting.
- Perform constructive review.
- Acknowledge uncertainty.
- Make estimates compatible with a project control system.
- Set up a data base of estimating history.
- Provide for macro estimating capability.

Consistent Structure

For effective estimating, the first component, a consistent structure, is needed to subdivide a project into understandable and manageable increments. Each increment should have a verifiable beginning and end — that is, be "deliverable" — so progress can be measured clearly.

Of course, bearing in mind that different types of projects need different structures will guard against attempts to make the project, or problem, fit the structure, or solution — instead of the other way around.

To achieve the best results, structures should be documented in such a way that they serve as a checklist. This will ensure against overlooking tasks and, at the same time, not impose unnecessary work on a project. Variations of the structure, or alternate structures entirely, should also be available from which to select the best fit for the work to be done.

'One Phase at a Time'

This brings us to the phase-limited approach which calls for developing a natural sequence of phases within the structure and for making detailed, "committed" estimates one phase at a time.

Committed estimates for the first phase are followed by target, or ballpark, estimates — based on limited knowledge — for future phases and for the total project.

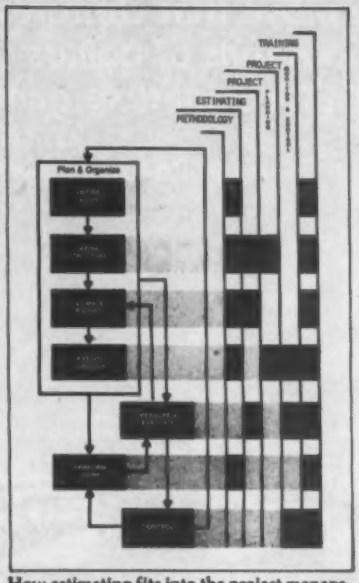
Discovering what time and costs were required for each completed phase, however, increases the pool of information on which to base committed estimates for the next phase as well as fresh target projections for the remaining future phases.

Part 1 of this three-part article on DP project estimating describes 11 components considered essential to achieve a consistently successful estimating process. Next week: how to relate the estimating process to the needs of project personnel and management.

This approach, therefore, is self-correcting, based on repeated refinement as additional information is gathered. So, even if the first estimate lacks pinpoint precision, the process quickly zeros in and prevents premature commitments based on limited information.

Deliverable Units

The third component requires that guidelines be set for estimating what goes into producing one deliverable unit — for example, one interview or one file. One such guideline is the normal range of effort required to produce one unit, which should be determined by amount of effort rather than by cost per unit to avoid premature concern with cost rates.



How estimating fits into the project management framework is shown above. Sanders' formula: "systems development methodology + project control + estimating + training = an operating system for your people."

Also playing a key role in the estimating

(Continued on Page 32)

Fortran Users Cite Objections TO X3J3's Decision on Blanks

By Marcy Rosenberg
CW Staff

Loss of programming flexibility and fear of costly conversions surfaced as the main objections by Fortran users to the standards committee's recent decision to make blanks significant in its next revision of the language.

To implement that decision, the American National Standards Institute's (Ansi) Fortran Standardization Committee, X3J3, plans to draw up syntactic rules to govern the placement of blanks in specified positions in Fortan statements [CW, March 31].

Under existing rules, blanks carry no syntactic significance and can be sprinkled arbitrarily anywhere in Fortran statements.

Users' views of the potential positive and negative impacts of introducing significant blanks into the language were gleaned through calls to randomly selected Fortan installations.

Uniform Structure

"I have no problem with rules to make the structure of statements more uniform," such as requiring blanks to follow key words or verbs, commented Michael Coffin, MIS director at Dow Badische Co., an Anderson, S.C., chemicals firm.

But if X3J3 defines rules that will reduce the current flexible use of blanks or require different logic, "that's another story."

In any event, Coffin claimed internal DP policies already exist to ensure that his de-

(Continued on Page 32)

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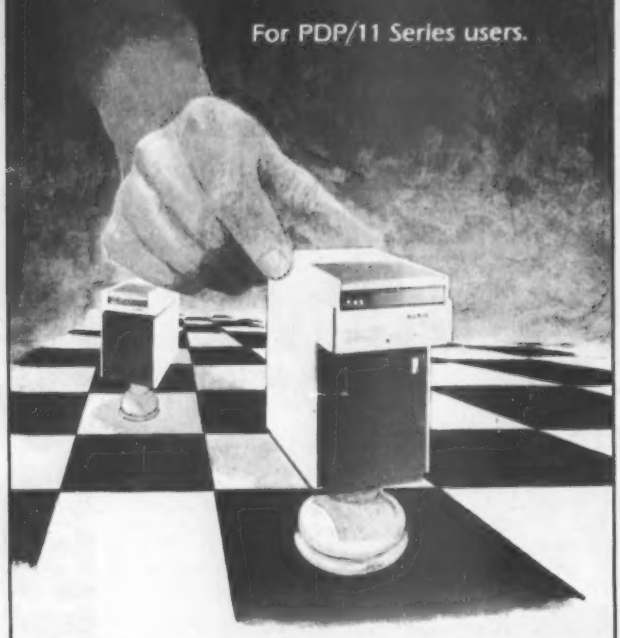

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Shared Service for Offices Handles Writing Functions

CUPERTINO, Calif. — A shared service for office automation that handles the writing functions of a manager or editor and allows split-screen text displays is available through the Tymnet and Arpanet packet-switched networks from Tymshare, Inc.

Accessible via a portable terminal that would serve as an "electronic briefcase," the Augment service allows professional personnel to work in an on-line mode anywhere they choose to carry the terminal, Tymshare said.

Augment capabilities include work, text and file processing, document preparation and information storage and retrieval. Most existing asynchronous Ascii terminals will suffice as Augment workstations, the vendor stated, and Tymshare can provide terminals as well as printers, modems and couplers to go with the service.

All Phases Handled

Augment handles all phases of writing, from initial memo or conception through multiple-input collaboration in drafts and review to the final typeset text, Tymshare claimed. The service can also function as a programming or research tool, personal appointment calender and calculator.

Further, Augment supports graphics terminals for computer-aided design functions and for producing line art for inclusion in a document, the vendor continued.

"Unlimited" text storage is reportedly available through time-shared access to Tymshare's mainframe computer systems for printer output. Magnetic tape output allows production of documents on photo composition devices and computer output microfilm.

On-Line Library

Augment's on-line library, called "the Journal," accepts material from all users and automatically catalogs the information for easy retrieval, a spokesman claimed.

Through the Journal, files can be accessed at any time from any location by any authorized user.

Unlike most word processors, which use the text line as a unit of information for manipulation and storage, Augment employs the "block of thought" unit — the paragraph — that forms an idea, the spokesman said. Files are built and maintained in a format similar to an outline.

Split-Screen Capability

Augment has a split-screen capability by which the viewing screen can be partitioned into as many as eight independent display areas. This capability allows geographically dispersed people to view each other's files alongside their own.

When revising a draft, a user can position the original file on one side of the screen, and portions of that file can be copied onto the other side without altering the original file, the spokesman explained.

Augment has a 45,000-word dictionary that automatically checks files for spelling errors and suggests correct spellings, the spokesman continued. The service also remembers to correct subsequent misspelling after the first mistake, and the user may add words to the featured dictionary, he added.

Cost of Service

Augment's costs are based on three service levels, with separate prices for prime time and non-prime time access. The prime time rate (from 6 a.m. to 6 p.m., local time) for service level 1 is $10/hour, which includes 3,000 pages of storage at about 2,000 char./page.

With 3,000 pages and 85 Augment resource units (ARU) per hour, service level 2 costs $18/hour. As a measure of connect time, mid-day ARUs cost 10 cents per unit separately, Tymshare said.

Service level 3 costs $25/hour, which includes 6,000 storage pages and 170 ARU/hour. That level has about twice the resource priority of levels 1 and 2, Tymshare noted.

After the first three months, Tymshare imposes monthly minimum billing of $1,000 to $5,000, depending on level and length of service.

Tymshare is located at 20705 Valley Green Drive, Cupertino, Calif. 95014.

Systems and Utility Software: How Do You Get Best Fit?

Generally, the more options w have, the more comfortable we feel — but the tougher it is to make the best choice.

Just such a challenge confronts user organizations in the market for systems and utility software as they try to sift through an ever-expanding number of available products for the one "best-fit" to their needs.

Making the right selection hinges on many considerations:

- How to evaluate the various types of systems and utility packages.
- How to choose a supplier.
- When to stick with software supplied by the hardware vendor — and when to turn to independent software developers.
- How to negotiate contracts.
- How to ensure the best maintenance for a multivendor installation.
- How to benchmark.

A June 30 *Computerworld* Special Report on systems and utility software will explore these issues. Contributed articles are welcome.

Please send tutorial essays, accounts of user experiences, reviews of current products and speculations about future trends — along with any related charts or graphs — to Marcy Rosenberg at CW, 375 Cochituate Road, Rte. 30, Framingham, Mass. 01701, no later than April 30. Texts should run no longer than six typed, double-spaced pages.

Package Lets DEC User Build Management System

NEW YORK — Described as a visual front end to a data base management system (DBMS), a software package that lets nonprogrammers construct information management systems on-line is available from Datability Software Systems, Inc.

Called Control 10/20, the software runs on Digital Equipment Corp.'s Decsystem-10 and Decsystem-20 interactive time-sharing computers and can be used only in conjunction with a DBMS, a vendor spokesman said.

Using about 50 pages of memory, Control 10/20 interfaces with Software House's System 1022 DBMS. Within two months it will also interface with National Information Systems, Inc.'s DPL and DEC's own DBMS, he added.

The software supports any CRT terminal with capabilities to clear the screen and address the cursor, according to the vendor spokesman.

Control 10/20 is said to generate information management systems based on user commands that position the cursor to modify the screen image. This screen description serves as the basis for the software's Build program to generate interactively a screen image consisting of field labels; field data types; field read, write and modify protection levels; general screen layout; and program passwords.

Besides providing integer, real, date and textual data-type checking, Control 10/20 can support more complicated data entry restrictions such as lists or ranges of acceptable values that users can define at system generation time, the spokesman explained.

The software also allows fields to have default values and supports relational mapping of one data base to another so default values for a particular field can be extracted from another data base, according to the spokesman.

In addition, the mapping facility allows user-supplied values to be verified in a master data base or returned from another data base.

An ad hoc report-writing facility is said to let users create management reports. Report commands can be saved on the user's disk area and recalled at a later time.

Control 10/20 licenses for $15,000, which includes five copies of documentation and one year's maintenance, from Datability Software Systems, Inc., 500 Tenth Ave., New York, N.Y. 10016.

'CA-Jasper+' Adapted To Back OS, OS/VS

JERICHO, N.Y. — CA-Jasper+, Computer Associates' job accounting and billing system for DOS users, now will support OS and OS/VS.

CA-Jasper+/OS is upwardly compatible with the DOS version, the vendor claimed, adding that basic data capture of IBM's Systems Management Facilities (SMF) and, optionally, of CICS and VM accounting information will remain structurally the same.

The OS version will include the package's computational report generator, Wizard, and will also contain the billing and cost allocation system available in the DOS version.

CA-Jasper+/OS is available for a perpetual license fee of $8,000 from Computer Associates, 125 Jericho Tnpk., Jericho, N.Y. 11753.

'UCC Eleven' Offers Rerun Management System

DALLAS — UCC Eleven, a job tracking and control system for IBM OS/VS operating systems, is available from University Computing Co. (UCC).

Operating in interactive and batch modes, the system contains both rerun tracking to monitor all production and rerun activity and rerun handling, which the vendor claimed eliminates the manual procedures normally associated with production runs or restarts.

Requiring between 5K and 6K bytes of memory, UCC Eleven offers both job and production status on-line inquiry features. Job status inquiry provides information on the most current execution of a job as well as past executions throughout a user-specified time period.

Production status on-line inquiry reports on abended jobs, successfully completed jobs and those which have been set up for rerun.

Basic batch reports include rerun and spoilage reports. The rerun report is said to isolate predominant or recurring causes of reruns and and assign responsibility for them.

The spoilage report quantifies the impact reruns have on resource utilization in a DP center, UCC said.

UCC Eleven costs $12,500, the vendor said from UCC Tower, Exhange Park, Dallas, Texas 75235.

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Eleven Steps to Effective Estimating Outlined

(Continued from Page 29)

process is common sense and good judgment, to be exercised in several ways:

Interpret the guidelines in context with the nature of the deliverable unit for each task; gather the right information to define and clarify the work to be done during the committed phase; select the most likely value within a normal guideline range; and recognize unusual conditions or constraints.

Estimating also depends on defining in advance the key determinants, or influencing variables, for each task. When using per-unit guidelines, anticipate how many deliverable units will be needed or how many times a task must be performed within a phase.

This procedure, however, should be flexible enough to accept influencing variables, or as a mix of size or complexity when such insights are possible.

Consistent Reporting

An understanding of the basis for and significance of each estimate can be gained through a sixth component, consistent reporting. Both the format and level of detail of the estimating "reports" should be tailored for their intended audience and purpose.

A consistent format allows the reader to concentrate on the meaning of the estimate rather than on trying to interpret an unfamiliar format.

In other words, unless estimates are truly communicated, they cannot serve as a meaningful baseline from which to assess and control changes.

'Egoless Estimating'

Estimates also improve when constructive comments are earnestly sought and addressed. Just such a climate of "egoless estimating" can be achieved when the meaning of estimates are understood, and arbitrary or defensive reactions, avoided.

In this context, constructive review may start with an informal walkthrough of the estimate with the project team, followed by a formal review and approval by management. Each review serves as an opportunity to verify intentions, identify constraints and generally sharpen the thinking that goes into the estimating process.

Another factor in egoless estimating involves admitting uncertainty. Acknowledging uncertainty helps to break old habits of expecting unwarranted precision, especially in early project phases, and can set the stage for creating the contingency plans vital to project management in a fast-changing and uncertain world.

It is usually as important to know when a phase or project can be done as it is to know what resources and costs are expected. Therefore, throughout the review cycle, estimates should be compatible with scheduling reports from a project control system. In this way, scheduling serves as a "test of reasonableness" of assumptions about resource availability and cost rates.

The most effective analysis of project experience is possible by using a data base of estimating history that integrates the basis for estimating, the estimates and the actual results.

Finally, to round out the estimating process, flexible provisions must exist for macro considerations, such as making ballpark estimates based on minimum project knowledge. Such estimates provide an impartial comparative yardstick for selecting alternatives, prioritizing potential projects or for long-range planning.

Typically, these three functions imply minimum estimating effort or limited available time, so quick response is an important characteristic of the macro estimating component.

Sanders is a senior project management consultant with Atlantic Software, Inc. in Philadelphia.

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Users Object to X3J3 Ruling

(Continued from Page 29)

partment produce uniform code. Therefore, he will not conform to outside standards unless beneficial in some way — "or unless the changes were insignificant in terms of cost."

That seems unlikely. With nearly 700 programs filling its Fortran library, his installation could well spend between 12 and 18 months and close to $500,000 to convert from the existing to a new form of code, Coffin estimated.

Taking a stronger stand against the committee's decision was Ronald K. Oines, research systems coordinator for Cities Service Oil Co. in Tulsa, Okla. "The more rules you have, the easier it is to be syntactically incorrect," he maintained, adding that his shop will not install a compiler to meet conventions for significant blanks.

Oines took that stand because he also does not want to give up the flexible use of blanks now permitted. Being able to insert blanks within constants — for example, writing 10 000 — can clearly notate numbers when all are, say, greater than 1,000, he remarked.

Conversion Effort

Agreeing with Oines was Dennis Anniballi, vice-president of systems for Ticketron, Inc.'s East Coast Systems Department in Hackensack, N.J., which handles automatic wagering systems for state lotteries and off-track betting.

What concerns Anniballi is the conversion effort that implementing rules for blanks may require. His software group writes its own code for all application projects — that is, "we write a dedicated operating system for each application," he explained. Fortran subroutines number in the thousands.

To convert source code to the new standard will take three man-months of effort and costs between $15,000 and $20,000, he projected.

"All that forcing people to go through a conversion will do is waste a lot of time," including a transition period when "people would be violating rules without knowing it," he remarked. "The standards committee should have something better to do."

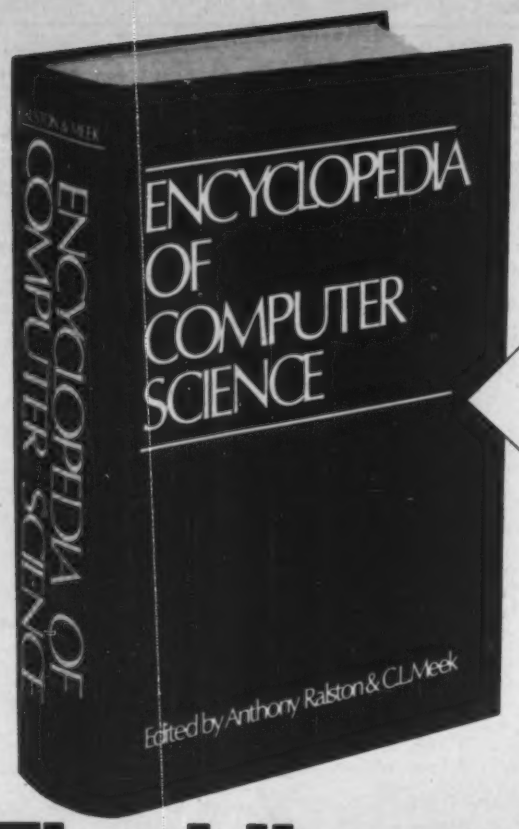
Not all reactions to the X3J3 decision were negative, however. "Making blanks significant forces more readable programs than we are now required to use," according to Walter Hutchins, manager of systems programming for the Mitre Corp.'s computer center in Washington, D.C.

"Since maintenance eats up 60% of the cost of coding, anything that forces you to write more readable programs pays for itself."

Patricia Gazdik, systems analyst for PPG Industries' Glass Research Division in Pittsburgh, Pa., also favors significant blanks for Fortran.

"Requiring blanks will make Fortran more readable and certainly remove ambiguities. I don't like to look at code that leaves out certain blanks."

Acknowledging that any change, however positive, will involve a relearning process, Gazdik stressed it is still important to progress with the times.



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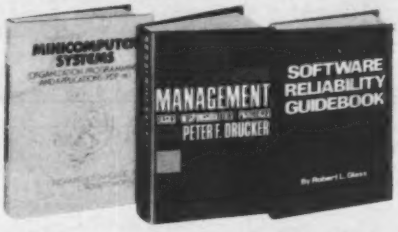

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Lightens Load on Personnel

Programming Aid Eases Merger

HILLSIDE, Ill. — A recent merger between Heritage Bank Corp. (HBC) and First Financial Accounting (FFA) meant that two different customer situations, 3,000 programs and two computer environments had to be joined in a common system.

HBC is a bank service bureau with 40 customers in the Chicago area, and in order to help ease the strain of combining two DP departments, it purchased Condor, an on-line programming development system from Phoenix Computer Corp.

Russ McCallister, an HBC consultant who handled the selection of Condor and has been overseeing the merger of the two DP departments, thinks the new system will lighten the load on programmers and improve their productivity. That is critical to him because he believes there is a lack of good programmers and he doesn't plan to enlarge his staff.

"All our customers are financial institutions," he said. "They need people in this kind of a center who can serve the diverse requirements of different institutions. You have to have a very good understanding of the applications for those end users."

McCallister thinks that Condor will make it easier for programmers to do their job efficiently because with it, they can perform many tasks at a single terminal. "It enables any programming person, in systems or applications, to do jobs more effectively from one place," he said.

Other Contenders

Before acquiring Condor, McCallister considered Vollie, from Applied Data Research (ADR). He called it "an extension" of The Librarian, a source management program system also offered by ADR and used by HBC before the merger. HBC still uses Librarian DOS/VS.

Vollie, which supports on-line program development in a DOS/VS environment and includes interfaces with The Librarian, was Condor's main competition, according to McCallister.

Also considered was Scepter, by Westinghouse Corp. Scepter executes an application under the Westinghouse Teleprocessing Interface System (Westi) in DOS or DOS/VS.

"I simply felt that because Condor interfaces with several DP monitors and several source program methods and is easy to operate, it is a superior product," McCallister said of his final decision.

McCallister noted that Condor allows programmers to access programming materials within The Librarian and at source, object relocatable and executable levels within DOS/VS.

"Bringing up Condor as a stand-alone was a snap," McCallister recalled. "We did a minimum of definitions, ran five assemblies, and in one hour it was up and running and interfacing with our Librarian master and IBM standard source statement libraries."

However, one problem occurred during the early use of Condor. According to McCallister, the version of DOS/VS CICS/VS presently in use at HBC is not current, and because of that, there was difficulty in getting Condor to operate under both DOS/VS and CICS/VS. The problem was solved by making some adjustments to Condor.

The merger of the two DP departments is nearly complete. The changes have left HBC with two large machines: an IBM 370/145 under DOS/VS, CICS/VS; and an IBM 360/65 under Software Pursuits, Inc.'s DOS/MVT and CICS DOS Standard.

HP Desktop System Gains Commands in ROM

PALO ALTO, Calif. — Both end users and OEMs will have access to structured programming commands for the Hewlett-Packard Co. Series 9800 System 35 desktop computer.

The commands are available from HP in the form of plug-in, read-only memory (ROM).

The HP 98335A structured programming ROM provides decision-making and loop-control structures like those in Pascal, but retains the "friendliness" of the System 35's enhanced-Basic language, HP claimed.

According to a spokesman, the language additions increase efficiency and lower program maintenance costs by providing a self-documenting structure that is easy to understand.

Pascal-like syntax added by the structured programming ROM includes INDENT, XREF, WHILE/END WHILE, REPEAT/UNTIL, LOOP/-EXIT IF/END LOOP, IF/-THEN/ELSE/END IF, and SELECT/CASE/CASE ELSE/END.

The structured programming ROM costs $500, the spokesman said from 1501 Page Mill Road, Palo Alto, Calif. 94304.

Career Guidance System Offered in Adult Version

WHITE PLAINS, N.Y. — IBM is offering an adult version of its career guidance system originally developed for high school students and their counselors.

Seven data banks are provided as part of the sample bases, combining interactive dialogue and simulations with original and sample data files, the vendor said.

The programs operate under DOS/VS or OS/VS operating systems and run on IBM 370 and 4300 CPUs that use Isam file access methods or with modifications.

Running under CICS/VS, the Discover program reportedly supports several features of IBM 3270 terminals.

The base system costs $750/mo plus $250 for either the secondary school version or the college adult version.

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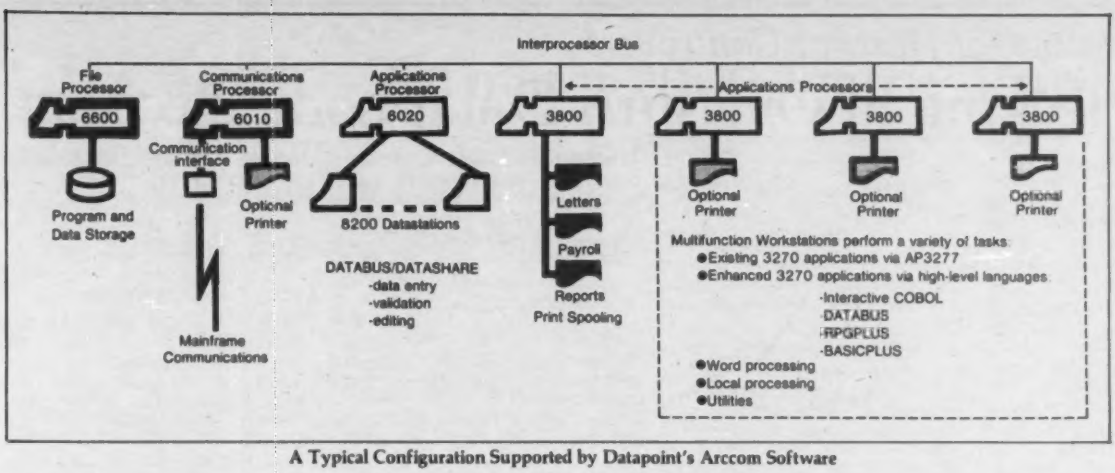

A Typical Configuration Supported by Datapoint's Arccom Software

Datapoint Ties ARC, Remote Processors

SAN ANTONIO, Texas – Datapoint Corp. has released a family of software products that share communications facilities among multiple processors to permit interactive processing between the vendor's Attached Resource Computer (ARC) and remote mainframes.

Compatible with high-level languages such as Cobol, RPG-Plus and Basic-Plus, the Arccom software family is said to expand the variety of tasks users can perform from the same workstation.

One product, Arccom 3270, is an interactive communications and emulation package that lets users run existing applications for IBM 3270 and equivalent intelligent terminals without modifying the mainframe's hardware or software, Datapoint stated.

With Arccom 3270, users can write high-level 3270 applications for local processing and operator-transparent mainframe query, a spokesman added. And users can take advantage of the local processing power of Datapoint's Databus commercial language to write data entry, validation, editing and other tasks, he said.

Communications between the applications processors and the mainframe is handled by a Datapoint Model 6000 communications processor that emulates an IBM 3271 control unit. The Model 600 is connected to the ARC system by the interprocessor bus and to the mainframe by Datapoint's Model 9481 communications adapter, a synchronous modem and leased lines.

Data transfer between the communications processor and the mainframe employs Ebcdic code and the binary synchronous protocol at speeds up to 9,600 bit/-sec. A local printer can be attached to the communications processor to emulate an IBM 3280 series printer.

Datapoint's Model 6020 communications processor can emu-

(Continued on Page 40)

Kicks Off INA Line

DCA Unveils Network Processor

NORCROSS, Ga. – A network processor for medium to large private networks is available for point-to-point statistical multiplexing, multipoint statistical multiplexing and "full function," multinode data communications.

By adding a number of System 355 bus-oriented network processors from Digital Communications Associates, Inc. (DCA), network throughput can rise to 400,000 bit/sec, the vendor claimed. The System 355 kicks off the Series 300 product line, which is based on DCA's Integrated Network Architecture (INA).

The architecture allows private interactive networks to grow in size or performance, a spokesman stated.

"Point-to-point statistical multiplexing is the traditional multiplexer environment where many terminal devices are connected to a host computer over a single telephone line," he explained. "Data is formatted at the multiplexer, transferred over a telephone line using an error control protocol and then demultiplexed by another multiplexer at the other end."

(Continued on Page 40)

Overseas Options Extended

WASHINGTON, D.C. – AT&T has moved to give customers use of its regular telephone lines for data transmission between the U.S. and overseas locations.

In a tariff filed with the Federal Communications Commission (FCC), Bell proposed that the change take effect June 2.

The current tariff bars U.S. customers from using the carrier's overseas phone links for data communications, but earlier this year the FCC said it would consider repeal of this ban.

Under the proposed tariff (see Page 38 for analysis), Bell customers would be allowed to send various types of data, including facsimile, over Bell's Message Telecommunications Service from the U.S. to most foreign countries. The charge would be the same as for a regular overseas call.

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Interconnection at Heart of Controversy

WUI Seeking to Overturn Dataphone Decision

By Phil Hirsch
CW Washington Bureau

WASHINGTON, D.C. — A bitter battle between international record carriers (IRC) and AT&T entered a new round last month when Western Union International, Inc. (WUI) asked the Federal Communications Commission (FCC) to defer its recent decision permitting the phone company to offer international dataphone service.

WUI submitted a similar request to the U.S. Circuit Court of Appeals here to ensure another hearing in case its FCC petition is turned down.

At the heart of the controversy are Dataphone and Datel, two services designed for low- and medium-speed data communications users. Dataphone service transmits data, facsimile and Telex-speed messages via standard analog telephone lines. It's available only between terminals located within the domestic U.S. Datel is an international service that employs computer switching and operates at speeds up to 9,600 bit/sec over specially conditioned lines.

December Decisions

Last December, the FCC authorized the telephone company to extend its Dataphone service overseas; simultaneously, the commission allowed the IRCs to add several enhancements to their Datel offerings.

The severe limitations previously imposed on the use of Datel for transmitting voice messages were lifted, for example. In addition, the commission said the IRCs could offer Datel directly to 21 additional cities within the U.S. (previously, they had been limited to five "gateways" on the Atlantic, Gulf and Pacific coasts).

WUI and the other IRCs oppose the FCC decisions for a number of reasons. The most controversial one is that to tap their newly created Datel market, they will have to interconnect with AT&T's long-distance (MTS) telephone system. and they do not like the interconnection scheme mandated by the commission.

User Savings

If and when this argument is settled, it could produce substantial savings for international data communications users.

Analysis

At the moment, most international telephone customers who also want to transmit data must lease a seperate service — such as Telex or Datel. Likewise, most Datel users that want to send a voice message overseas must employ AT&T's international telephone facilities.

In either case, the charges are significantly greater than they would be if a single service were used for both types of traffic. That, at least, was one of the assumptions underlying the FCC's decisions last December.

Spurred Competition

The commission also contended that removing the restrictions would spur competition.

"To the extent that use of AT&T's international [telephone] facilities may . . . be substitutable for various record services offered by the IRCs, the potential for a greater degree of competition [in the international communications market] is enhanced. "This should . . . stimulate innovation in services and lower rates for consumers," the commission said.

Similarly, the thrust of the decision letting Datel users transmit voice in addition to data is "to enhance customer choice and . . . allow for a more efficient use of existing common carrier facilities."

The FCC decision devotes a good deal of attention to the impact of international Dataphone service on the international record carriers' Telex business — which accounts for more than 50% of their revenues.

The decision concludes that "the evidence as a whole is consistent with the contention that Dataphone may serve as a substitute for Telex."

However, even if Dataphone does provide a cheaper alternative, the commission added, the IRCs could solve the problem by lowering their Telex rates.

This latter comment suggests one of the underlying reasons for the international record carriers' opposition to the FCC's recent decisions. By allowing the phone company to offer international Dataphone service, the commission has presented the IRCs with a Hobson's choice: either they reduce Telex rates — their bread-and-butter revenue producer — or they run the risk of losing a substantial percentage of their Telex customers to AT&T.

'Basic' and 'Enhanced'

The commission attempted to sweeten this bitter pill by requiring AT&T to provide a "basic" Dataphone service on its exsisting international telephone circuits. "No modification of, or additions to," these circuits will be allowed under the FCC Dataphone order. The FCC's goal is to establish two distinct services: "basic" and "enhanced" Dataphone.

The former is for those who find "the limited data transmission capabilities of AT&T's [international telephone] network sufficient for their needs."

The latter service encompasses the IRCs' present Datel offerings plus the expanded voice transmission capability added last December. This enhanced Dataphone service, the commission said, is for those customers "needing individualized and more sophisticated capabilities" not included in the basic Dataphone service authorization granted to the phone company.

The implication behind all this is that giving the IRCs a monopoly over enhanced Dataphone service will make them less reluctant to accept competition between basic Dataphone and Telex.

FCC 'Horse Trade'

But the IRCs are not willing to accept the commission's horse trade. They want to offer a "basic" Dataphone service — utilizing standard international voicegrade circuits connected to AT&T's domestic telephone network — as well as the "enhanced" version.

The IRCs also want the voice component of their Datel offerings to compete directly with AT&T's international telephone service. That, essentially, is what the interconnection fight is all about.

The FCC, in its December Dataphone order, said the IRCs would have to interconnect with AT&T on the same terms the telephone company offers "other common carriers" like MCI Communications Corp. and Southern Pacific Communications, Inc. Western Union International, in the petition it submitted to the Commission last month, said these terms would "accord AT&T an unfair competitive advantage. The company added that the commission should order AT&T to offer interconnection arrangements enabling the IRCs "a fair opportunity to compete with the expanded Dataphone offerings of AT&T."

WUI Statement

What WUI is after, specifically, was spelled out in a statement it sent to the commission during one of the earlier rounds in the Dataphone /Datel battle (which goes back at least to 1965). The company's major demands include the following:

Access to WUI international circuits "must be provided by dialing no greater number of digits than is required to access the overseas lines of AT&T." At present, according to WUI, a customer wanting to access an international record carrier's Datel circuit via AT&T domestic facilities must dial seven to 11 digits "merely to reach the IRC"; to reach AT&T's overseas telephone circuits, by comparison, the customer needs to dial only two or three digits.

Moreover, "the transmission path must be of equal quality to that available via [AT&T] Long Lines," and "the division of tolls must be no less favorable to WUI" than to Bell operating companies.

In the FCC's view, "the IRCs' requests constitute . . . a demand for total integration of the IRCs into the domestic [telephone] network and go far beyond what we envisioned or intended in [the Dataphone/Datel proceeding]."

However, the commission did not close the door completely on the IRCs' interconnection demands. It indicated that a final decision on whether to authorize "additional interconnection entitlements" will be made later this year, after the National Telecommunications and Information Administration finishes analyzing the technical and economic aspects of interconnecting AT&T and IRC circuit facilities.

In the meantime, however, the FCC told the international record carriers they would have to accept interconnection on the same terms AT&T offers other common carriers.

This is the part of the Dataphone/-Datel decisions which WUI is most anxious to overturn. As the company explained in the petitions it filed last month at the commission and the U.S. Circuit Court of Appeals, "the losses which WUI would experience would be irreparable.

"The Dataphone order would give AT&T a head start in dealing with customers under terms which afford convenient and technically sound access to the network . . . It seems certain that this business could never be recovered."

There is some basis for WUI's fear. Late last month, AT&T filed tariff changes implementing the FCC's December decisions. The changes establish a new "International Dataphone Service" and also offer interconnection to the IRCs for their Datel services on the terms laid down by the commission.

These changes will become effective June 2 unless delayed by the FCC or the appeals court.

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GE Launches Terminet 2000 Matrix Printer Line

WAYNESBORO, Va. — They are compact, quiet and need little power. So said General Electric Co. of two serial printers that launch its Terminet 2000 family of impact matrix devices.

With print rates of 30- and 120 char./sec, respectively, the Terminet 2030 and 2120 printers weigh 22 lbs; stand 22 in. wide, 18.5 in. deep and 5.5 in. high; and run at a noise intensity of less than 60 db. They draw 30W and 50W of power, respectively, a spokesman added.

GE will soon release several options permitting the two printers to deliver output from remote processors, he said. These include a 300 bit/sec modem, RS-232C and current loop interfaces, a 4K-byte data buffer and a 32K-byte edit buffer.

GE also plans to incorporate the printers in integrated work-stations available in several optional configurations, ranging from a simple stand, with space for accessories storage, to complex configurations with removable storage units and communications controllers.

Anticipated Applications

Data communications applications anticipated for the Terminet 2000 line include general transactions, financial reporting, message switching, private networking, reservations booking and various small business tasks, the spokesman stated.

Third-party distributors will sell the 2000 line products — an arrangement that should ensure prompt delivery to end users and OEMs, the spokesman claimed.

Both the 2030 and 2120 feature a 7 by 9 dot matrix printhead mechanism that employs blade-mounted pins. Allowing character underline, this mechanism yields bidirectional printing without fill characters. Print density is selectable at 10-, 13.2- and 16.5 char./-in. along a 13.2 in. print line.

The 2030 and 2120 serial printers offer catch-up print rates of 60- and 150 char./sec, the spokesman continued. Their ribbon cartridge is stationary with the ribbon driven by a stepper motor. Featuring a Mobius loop, this cartridge extends ribbon life to about three million characters, the spokesman maintained.

Feed Mechanisms

A friction-feed platen handles paper feed, but optional tractors are available and may be field-installed. Feeding may proceed from the back or the bottom of the Terminet 2000s, which generate up to three copies, including the original.

With a 5 in./sec. slew rate, the printers produce 2-, 3-, 4-, 6-, 8- and 12 line/in. vertically. Their microprocessor-scanned keyboard has the Ansi typewriter-style arrangement as standard, but optionally comes with the Ansi/APL arrangement or with a numeric cluster pad.

Users may buy the Terminet 2030 and 2120 in the $1,400 to $2,300 and the $2,100 to $3,000 ranges, respectively. OEM discounts are available from the Business Department of GE's Data Communications Products Division in Waynesboro, Va. 22980.

SNA Newsletter Debuts

SAN JOSE, Calif. — A monthly newsletter covering developments with IBM's Systems Network Architecture (SNA) was launched here recently.

"SNA Perspective" is edited for technical and management personnel who use SNA or are considering implementing the architecture, which IBM has made the foundation of its offerings in data communications and decentralized DP. The newsletter will also serve vendors of SNA-compatible equipment, according to the publisher, Communications Solutions, Inc.

Charter subscriptions for "SNA Perspective" are $62 and $105 for one and two years, respectively. Regular rates are $95 and $165 for one and two years, respectively. Communications Solutions said from Suite 200, 4040 Moorpark Ave., San Jose, Calif. 95117.

Lexitron WP Systems Get Communications

CHATSWORTH, Calif. — Lexitron Corp. has introduced six data communications products for its VT family of word processing (WP) systems.

All six options are software-controlled and operate on a menu selection basis, a spokesman said. VT systems equipped with appropriate communications firmware can be converted to communicating processors of text by loading any of the options and selecting transmission criteria from an interactive menu page, he explained.

An asynchronous point-to-point communications option allows transfer of data between VT terminals at user-selectable rates of 300-, 1,200- and 2,400 bit/sec, the last rate allowing directly and locally connected VT systems to transmit text without a modem.

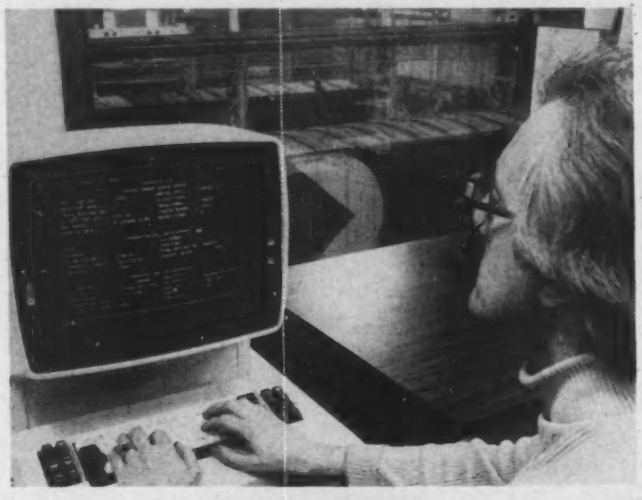
Another option, asynchronous Ascii, permits VTs to access networks that support teletypewriter terminals and communicate with nearly every mainframe, minicomputer or other terminal that receives the Ascii set.

A third option, asynchronous emulation of IBM's 2741 terminal, allows VT systems to function as a communicating text processor that emulates a 2741. It permits direct links with IBM-compatible systems for tasks such as the storage and retrieval of information from mainframe data bases or communications with other word processing systems.

Lexitron also released synchronous emulation from IBM's 2780 and 3780 protocols. Those two options allow VTs to emulate IBM-compatible bisynchronous terminals for batch, remote job entry and query/response tasks.

Finally, the vendor's synchronous point-to-point communications product allows VTs to communicate with other Lexitron systems under bisynchronous protocol at up to 4,800 bit/-sec.

All six options cost $1,200. Lexitron is at 9600 DeSoto Ave., Chatsworth, Calif. 91311.



Train Brain

The Canadian Pacific Ltd. terminal operator in the above photograph can get updated information on the repair status of railway cars such as those visible through the window behind his screen. Canadian Pacific inspectors regularly search for "bad order" cars in the firm's fleet. When damage is detected, its extent is assessed and the appropriate repair facility is notified. Terminals like the IBM 3276-2 shown have reportedly helped Canadian Pacific improve its monitoring of car maintenance by 10%. The Montreal-based firm has 68,000 cars that cost $54 million to repair last year.

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Modem Goes 100 Miles

NEWPORT, R.I. — A 9,600 bit/sec modem designed to operate synchronously over voice-grade telephone lines at distances up to 100 miles is available from Avanti Communications Corp.

Targeted for intra- and intercity data distribution or for placement at ends of satellite or microwave networks that do not warrant long-haul sets, the Model 9600 modem can fall back to 7,200- and 4,800 bit/sec rates and is compatible with the CCITT V.29 standard.

The Model 9600 modem costs $3,250 and comes as a desktop or rack-mounted unit. Avanti's address is Aquidneck Industrial Park, Newport, R.I. 02840.

Software Ties ARC, Remote CPUs

(Continued from Page 37)

late up to 32 IBM 3277/3280 devices, the spokesman noted. The 6010 can emulate up to eight such devices.

Designated Model AC 3271B, software for the communications processor maintains a runtime screen display that specifies the poll address of the processor, line and modem condition, number of blocks transmitted and received and line errors, if any. Moreover, a "trace" feature reportedly permits the processor screen to display in hexadecimal code the characters transmitted and received via the communications adapter to permit visual monitoring of the communications line during operation.

Another module, the Arccom 3270 emulator utility software (Model AP 3277), allows any Datapoint 3800 processor on the ARC system to execute existing 3270 applications without modification of its hardware or software, the spokesman maintained. AP 3277 lets a 3800 emulate an IBM 3277 terminal and, if a local printer is attached, will support IBM 3280 emulation, he explained.

The user can employ Arccom 3270 software to emulate 3270 terminals or to write a high-level language interface. Such a program could perform local file processing and, when the required information is not available in the local data base, query the host.

The request goes to the host via the Arccom communications processor; the response is reported to the operator without his intervention.

According to Datapoint, all the capabilities inherent in the ARC system are enhanced with the Arccom software. By attaching certain components, functions such as print spooling, time-sharing, telephone communications control, word processing and electronic message switching can be added to ARC under these modules.

Arccom 3270 communications and emulation software is available without charge when ordered with Datapoint equipment. For users with existing gear, Arcom's one-time license fee is $500; monthly maintenance is another $15, Datapoint said from 9725 Datapoint Drive, San Antonio, Texas 78284.

DCA Unveils Network Processor

(Continued from Page 37)

With DCA gear, such an application would require two System 355s for each trunk line connection.

"Multipoint statistical multiplexing," on the other hand, "allows a terminal user to connect many clusters of remote terminals to a single telephone line," the DCA spokesman continued. A System 355 could serve as the master network processor in this application, eliminating the need for several point-to-point configurations, he said.

That reportedly would reduce phone line costs and the number of multiplexers required.

"Full function, multinode data communications refers to large networks where many host computers and many remote terminal sites must be interactive," the spokesman said. In this third type of application, according to DCA, a System 355 can provide "complete network management and control tools."

Seven Functions

Functions performed by the System 355 include these seven:

- Host selection, which permits more than one computer to connect with a centralized network processor.
- Centralized demultiplexing, which allows data to flow from a single master network processor through 62 trunk links.
- Multipoint trunk handling, allowing 16 drops off a single line.
- Network routing of data to and from terminals without operator intervention.
- Port contention, which permits terminal users to link destination ports on a first-come-first-served basis.
- Network control and management.
- Built-in diagnostics.

Host selection with the System 355 allows data from asynchronous terminals to be routed to as many as 256 computers or applications within a single network, the spokesman said. The number of possible connections "far exceeds" a network's average size, he claimed.

With centralized demultiplexing, the System 355 can demultiplex data from the trunk links and route it to other trunks or to the network's host processors. This extends INA functionality to remote clustered terminals without any need for separate boxes to handle large numbers of trunk connections.

Although multipoint trunk handling may slightly reduce network response time, depending on bus speed and application, the System 355 function will deliver large dollar savings to offset that effect, the spokesman maintained.

The network manager can employ the port contention function to determine the number of ports needed. The System 355 offers tools to measure the net's terminal activity, the spokesman explained, and can contend for host ports with the ports of incoming terminals.

As terminal ports increase, more host ports can be added to the contention group. A single System 355 can contend for up to 124 ports.

With the sixth function, network control and management, the network manager can use the net console to change destinations, sources and transmission speeds, the spokesman continued.

Finally, the System 355's built-in diagnostics put the processor through a diagnostic procedure, checking out hardware and software, whenever the network is powered up.

The System 355 is compatible with DCA's other network processors — the System 105/4, 105/8, 115, 205, 250 and 210. In fact, the 105 and 115 can serve as remote units to a master 355 in either point-to-point or multipoint networks.

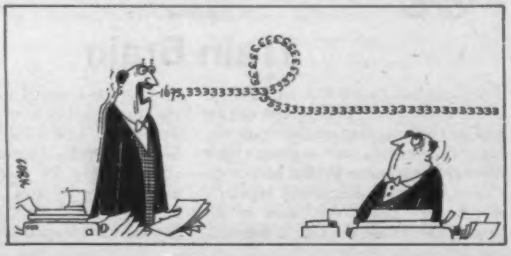
Configuration Prices

Prices for the System 355 network processor vary depending on the configuration. A basic 32K-byte version with trunk link modem cables but without port modules, adapter modules or port cables costs $8,750.

In a free-standing rack 6.5-ft high, a more advanced version costs $10,000. Network port modules, required for operation, cost $300 per pair.

Among supporting software, gateway interfaces to GTE Telenet Communications Corp.'s X.25 protocols and to the X.25 protocols available through Canada's Datapac cost $2,000 for either packet-switched network.

DCA is located at 135 Technology Park/Atlanta, Norcross, Ga. 30092.



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TWO NEW COURSES IN IMS DATA DESIGN.

Amdahl Education Center is now providing a class on **DB/DC Data Design Concepts,** and **IMS Application Design Review Methodology**. Both courses offer innovative, approaches in the area of data base design.

The DB/DC class teaches the effective use of the tools of design rather than mechanics. Some of the issues covered are system performance, system flexibility, large data base problems and alternatives, system availability, and restructuring data bases. The concepts taught apply to data base management systems in general, with specific examples relating to IMS.

The Design Review Methodology class offers a different approach to design review: a structured set of questions aimed at all aspects of the reviewed system's environment. The Amdahl approach is three-tiered, targeted at unearthing problems as early in the life of the project as possible. The three review levels are architecture design review, physical data review, and program review. One to three levels of the review can be utilized, depending on the stage of development of the system.

Both courses have been well received by students. One who attended the DB/DC class said, "...it gave me a different perspective on data base design which will be extremely useful."

A manager wrote of the IMS design review, "It uncovered areas of concern, pointed to probable solutions to obvious problems, and provided valuable IMS education along the way."

In 1980, both courses are offered at the Sunnyvale Education Center and at the Columbia Education Center.

NEW SMP & MVS WORKSHOPS

AMDAHL ANNOUNCES NEW MVS INSTALLATION AND SMP WORKSHOPS WITH EMPHASIS ON PRACTICAL EXPERIENCE.

Amdahl Education Center is now accepting applications for their SMP Maintenance Workshop and MVS Installation Workshop. Both 5-day courses feature personal instruction augmented by extensive "hands-on" computer lab time. The course content will be practical rather than theoretical so individuals will be able to immediately and profitably apply the information they have learned.

During the MVS Installation Workshop, the student performs a complete MVS/JES system generation and IPL's the newly created system. In addition, each student will install sample TCAM, VTAM, and TSO systems. Approximately half of class time is spent in supervised computer lab instruction. This amount of dedicated computer time makes this course an industry first.

In the SMP Maintenance Workshop, the student actually applies maintenance to an MVS system, as well as installs new functions using SMP, release 4. The class teaches the graduate of the MVS Installation Workshop, or the MVS, VS1, IMS/VS, or CICS/VS system programmer to control and maintain those systems using SMP, release 4. This class is the only class in the industry that teaches SMP, release 4, from scratch and allows extensive "hands-on" experience with the product in class.

The **MVS Installation** and **SMP Maintenance Workshops** will be offered once a month at the Amdahl Education Center in Sunnyvale, California. The first offerings of each class are scheduled for **June 16, 1980,** and **June 23, 1980,** respectively.

AMDAHL EDUCATION CENTERS NOW ON BOTH COASTS.

A second Amdahl Education Center has been opened at Amdahl Corporation's Eastern Support Center located in Columbia, Maryland.

Conveniently located for the entire Eastern Seaboard, the Columbia Education Center includes access to the Amdahl corporate 470 computer system, and provides students the same unique "hands-on" approach to software education that was pioneered at the Sunnyvale, California, Education Center.

The Support Center currently occupies space in the Sterrett Building in the Columbia Corporate Center. In addition to the Amdahl Education Center, the facility provides hardware and software support and consulting services for Amdahl customers in the Eastern United States.

CALL TOLL-FREE TO ENROLL

For course descriptions, class schedules and enrollment forms, call toll-free: 800/538-8460 ext. 6393, in California call 408/746-6393, or write: Amdahl Education Center, M/S 302, P.O. Box 470, Sunnyvale, CA 94086.

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Education Center, Amdahl Corporation, 1210 East Arques Avenue, P.O. Box 470, Sunnyvale, CA 94086

Transmission System Replaces Wide-Band Gear

ROCHELLE PARK, N.J. — A transmission system from Timeplex, Inc. functions as a cost-saving alternative to the wide-band facilities required for 19.2K bit/sec data communications, according to the vendor.

The Lineplexer Transmission System (LTS-1) includes Timeplex's M9600 modems, cables and enclosures. With a system at each end of the circuit, the LTS-1 provides 19.2K-, 14.4K-, 9,600- and 4,800 bit/sec operation over voice grade circuits.

For higher speeds, the LTS-1 splits the data into two streams, allowing operation over two independent telephone channels, the vendor continued.

The transmission system initiates automatic data-rate fall-back if telephone line degradation prevents operation of the highest desired data rate. Independent channel fall-back also is provided, so that if one of the channels becomes completely inoperable, single channel operation can be maintained, Timeplex stated.

Because the LTS-1 is capable of tolerating up to 800 msec of differential delay between phone channels, two independent channels can be routed over different paths.

For systems that require high reliability at data rates of 9,600 bit/sec or slower speeds, the LTS-1 can be used to send the same data over both channels, the vendor said. This capability reportedly gives full-channel redundancy with automatic switchover.

The LTS-1 costs $15,500. Timeplex is at One Communications Plaza, Rochelle Park, N.J. 07662.

Terminals to Serve Dutch Post Offices

WASHINGTON, D.C. — By June of this year, computer terminals will be added as another customer service in 40 post offices across the Netherlands, according to the Royal Netherlands Embassy here.

The terminals will give walk-in access to three computers, reduce paperwork for customers and clerks — as well as waiting time at the post office counter — and provide information on a number of complicated services, a spokesman said.

The terminals will be hooked up to the Netherlands postal service computer at Leidschendam, the Postal Savings Bank computer at Amsterdam and the national Postal Giro (a postal checking system) computers in Arnhem and The Hague.

PTT Experiment

The terminals program is a new service of The Netherlands' Post, Telegraph and Telephone (PTT), a state monopoly combining a number of common-carrier communications services, the spokesman explained. The service began as an experiment in early 1976 when the PTT installed terminals in 11 of its post offices. Equipment should be in place at 40 post offices by the end of May.

Other agencies of the Dutch government are considering similar applications of a public data base service, the embassy said. By 1981, the post office application will be linked to Datanet I, a public data network planned for support of Dutch agencies and eventual ties to data bases across the European Common Market.

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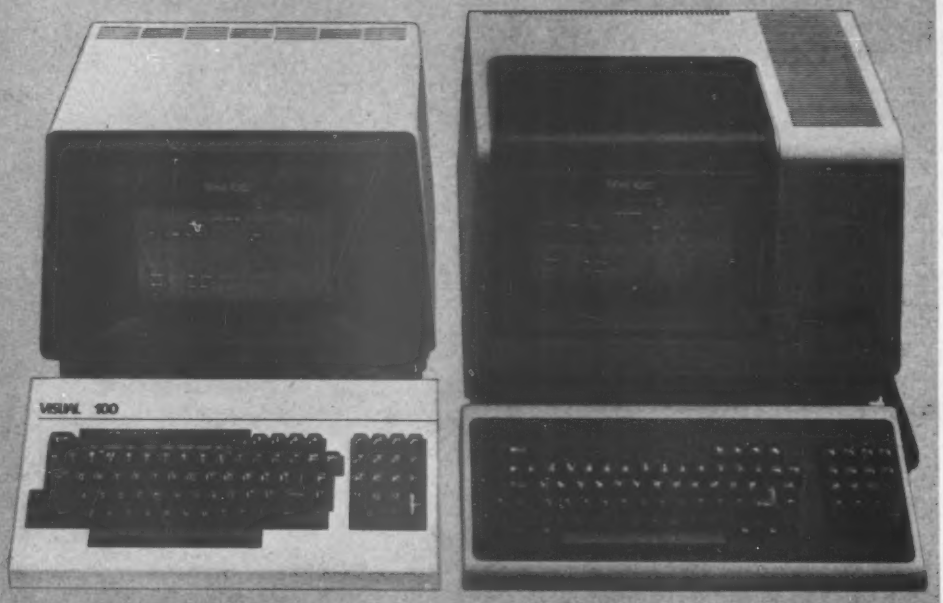

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Infrared Light Transmits Data

NEWPORT, R.I. — Lite Link is a remote computing system that utilizes an infrared light beam to communicate computer data at unobstructed distances as great as one mile, its vendor, Newport Data, Inc. (NDI), claimed.

According to an NDI spokesman, Lite Link may be directly connected to standard terminals, concentrators and communications adapters and costs one-tenth as much to operate as traditional cable-to-telephone systems.

The raw data to be transferred originates in the form of a high-speed infrared light-emitting diode that is turned on and off at speeds as high as 500K bit/sec.

The data then passes through an aspheric lens as a light pulse is converted into a pencil beam and transmitted to a remote receiver where the pulse information is decoded.

Data may be transferred in full-duplex and synchronous or asynchronous mode. Available transmission rates include 500-, 2,400-, 4,800-, 9,600-and 19.2K bit/sec.

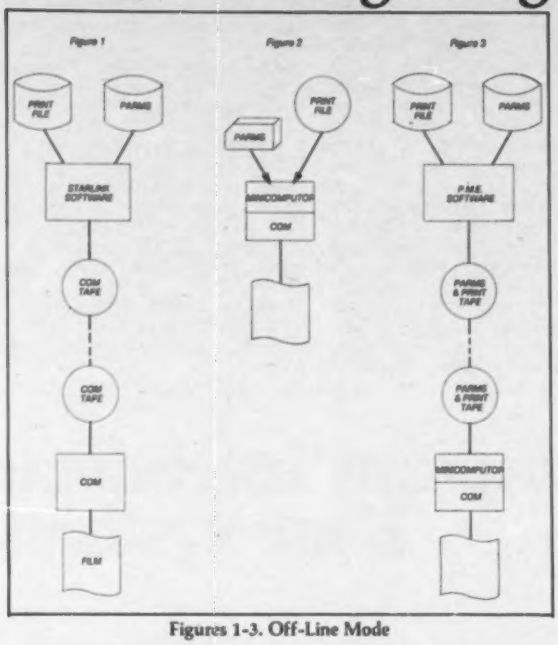
The only serious impediment to the beam is dense fog, which may disrupt or destroy the signal, the spokesman said. He added that the system is not disrupted by birds or rain.

Large corporate plants and large buildings on university campuses and in big cities are considered to be prime potential users of Lite Link, according to the spokesman.

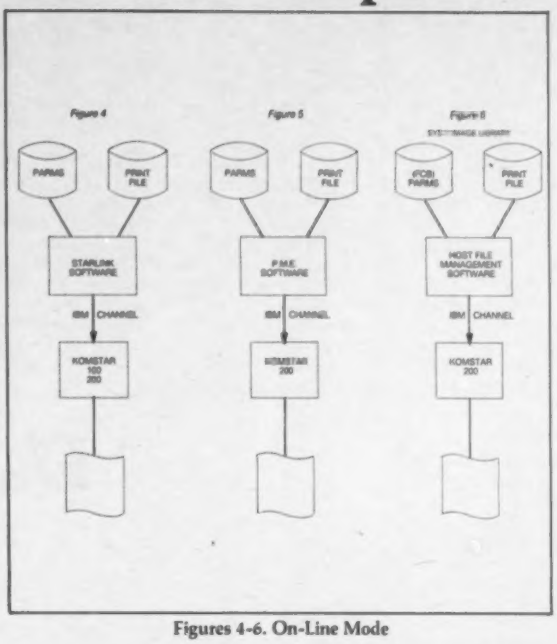
The system costs $15,000 per pair of terminals. An optional mutiplexing capability will be available in June and will boost the price to "somewhere less than $20,000," the spokesman said from Newport Data, Inc., P.O. Box 750, 126 Thames St., Newport, R.I. 02840.

Thanks to Software Options

COM Coming of Age as 'True Peripheral'



Figures 1-3. Off-Line Mode



Figures 4-6. On-Line Mode

By David W. Burnett
Special to CW

For nearly two decades, manufacturers of computer output microfilm (COM) equipment have touted their hardware to data processing managers as peripherals that could be added to the DP environment and used as easily as a line printer. The problem is that the discussions were mostly one-sided. The manufacturers did the touting, but DP managers were slow to adopt COM as an alternative printer.

COM technology has made major technological strides — both in software and hardware — in the past 10 years. But is it ready to be considered a peripheral today? I believe it is, and it will prove to be a more viable alternative in the future as paper prices go up and storage space becomes more cramped.

Many of the hardware objections have been overcome in the emerging third-generation equipment, which is dominated by solid-state technology with minicomputer and microprocessor components. COM has become plug-compatible as a line printer.

The new acceptability of COM, however, has been the result of the development of software to use with it. Vendor-produced software, which did not exist a decade ago, now provides support packages that can be used either on host computers or in the minicomputers of the COM units. Most development of the vendor-produced software has taken place since the early 1970s, and falls into three basic categories:

• *Output-directed software.* Early software developments were directed toward formatting data in the CPU so it would be acceptable by the COM device. This was relatively easy to do for 16mm roll film applications since 16mm parallels continous forms computer printing. Limited retrieval software was also available, but much of this required user programming to adapt it to the users' systems.

With the introduction of microfiche, COM suppliers were required to provide software to support title and index capability. Initially, fiche software was provided in modular fashion, requiring recompiling of each application program. When microfiche formats were standardized about 1973, with title and index placement also standardized, a steady parade of microfiche output and indexing software became available from the vendors.

• *Input-directed software.* Standard IBM formats have been supported for years. On-line interfaces for IBM systems have also been available, permitting standard print records to be accepted by the COM device directly from the host IBM computer. Most of these programs were written in assembler language, but by 1971, Cobol programs were written and adapted to other computer systems, such as Burroughs Corp., Honeywell, Inc. and Univac.

It was the introduction of the front-end minicomputer reformatter which changed the emphasis from output- to input-directed software. Its ability to reformat data from any acceptable tape makes it ideal as an interface medium to non-IBM computers.

(Continued on Page 46)

A Simon Legree for Computers

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COM Coming of Age as Alternative Printer

(Continued from Page 45)

Output management software within the mini was also developed to provide full value for the price. Thus dependence on host software began to decline as did the need for suppliers to support complex, output-directed software for special computers.

• *Operation-directed software.* Improving the COM operation itself was a neglected software function until very recently. Host computer software provides operational support in the form of job audits, report segmentation and some billing output.

Following the introduction of the front-end minicomputers, operational software began to appear. Error recovery and operator control of job setup were necessarily first. Later, job libraries were maintained in memory or on peripheral devices.

Host Control

With today's intelligent on-line COM, host computer control of the COM operation is possible.

Now even in off-line operation, fewer and fewer demands are being placed on the operator. Usually, operators can be performing other tasks, such as duplicating, while the COM is running. In the on-line mode, about the only operator attention required is to replenish the film supply.

For example, the Eastern Kodak Co. Komstar microimage processors were designed so everything except film and form loading is under parameter control. The design objective was to minimize operational differences between the COM device and a printer, so the Komstar 100 and 200 microimage processors look like the controller of an IBM 3211 or 1403 printer to the CPU.

Logically the COM can be controlled by using the forms control buffer (FCB) — the same as a 3211 printer. IBM operating systems often limit FCBs to 133 or 256 bytes for printers so other control options such as 512-byte control records or multiple control records may be used to support more extensive application features such as large titles or report segmentation. All of this may remain under program control without operator intervention.

Mix-and-Match Packages

In addition, an IBM resident program called the Parameter Management Executive (PME) was written. This programming allows the computer system to take an output spool file and concatenate these parameters which can be maintained on a standard data set file.

Kodak also developed Starlink software to reside within the user's host computer. This software, as it is doing its Komstar initialization and reformatting, is also capable of interacting with host processing.

These new packages provide flexibility for both on-line and off-line COM operation. The user can mix and match them to suit his needs. For example, the operator could use strictly an FCB and nothing else. Or he could pass the parameters under program control.

The diagrams show how this can be done in both off-line and on-line modes (see page 45).

In the first illustration, the print file is simply passed through the Starlink software in the computer to produce a COM print tape. The Starlink software is initialized by selecting job parameters (parms) from the parm file. The tape then is mounted on the COM tape drive and run.

In the second illustration the print file tape is mounted on the COM, and the parameters are entered. Both are input to the front-end minicomputer on the COM which controls it.

A third method of doing it is to have the print file and parameters resident on disk, then concatenate them with the PME software to produce a tape that contains them both. This tape is then mounted on the COM tape drive. The COM minicomputer automatically initializes the COM using the concatenated parameters and the job starts execution.

On-line configuration is quite similar. Figure 4 shows the print file and Starlink parameters are passed through the Starlink software, then down the channel to a Komstar 100 or 200 microimage processor.

In Figure 5, both the Komstar microimage processors parameters and the print file are disk-resident and are concatenated in the PME software for the intelligent Komstar 200 microimage processor. In Figure 6, the CPU uses a library of parameters, such as the SYS1. Imagelib for OS forms control buffers, to store Komstar microimage processor parameters. The parameters and print file go through a host management software system, then down the channel to the COM.

These options have eliminated the primary disadvantage to COM in the computer shop — manual setups on the machine. Now it runs automatically without the need for operator intervention.

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Burnett is a product specialist with the Business Systems Market Division of Eastman Kodak Co. in Rochester, N.Y.

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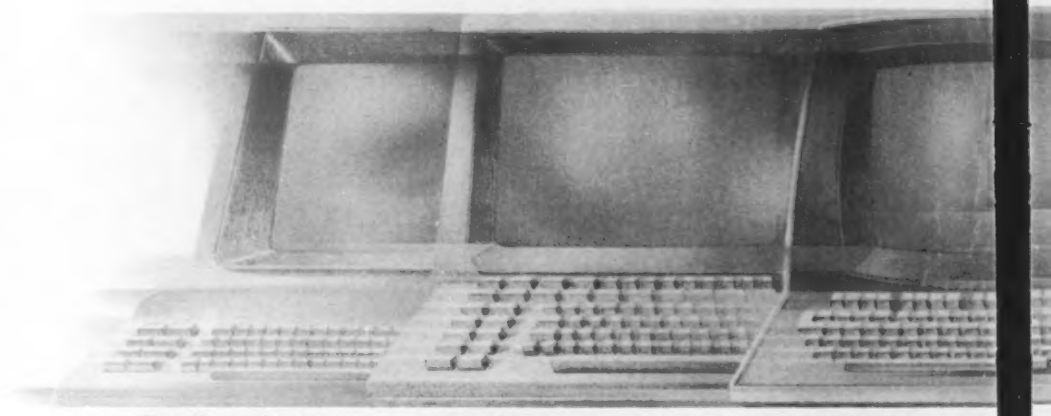

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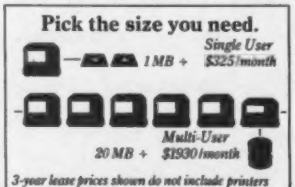

3-year lease prices shown do not include printers (many types available) or maintenance/installation charges. WP & EMS software licensed at $750 and $1500 respectively including training.

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At University of Pennsylvania

Humanists Nudged Toward DP for Research

PHILADELPHIA — The University of Pennsylvania here is planning to replace its IBM 360/65 with a 4341 this year as part of a program to increase the use of computers in the humanities.

But while the increased power will help, the university hasn't been standing still up until now.

"I'm trying to 'rev up' the use of the computer in the humanities," Dr. Howard Brody, associated dean for computing in the Faculty of Arts and Sciences, said. "I assume a lot of humanists have little card files and they keep lots of notes. Well, when you get 40 boxes of those card files, you can start losing control of what you are doing."

Here the computer can help, if only for sorting and remembering. But computers can also be used to correlate exhaustive research findings, saving time and money, he added.

Going for Baroque

The departments of music, religion and linguistics all have found interesting uses for the computer in the humanities, Brody said. Dr. Franklin B. Zimmerman, professor of music, is in the middle of a complex program which he said utilizes a "full core arrangement." It is called the Melodic Indexing Program — Melind for short.

"My ambition," Zimmerman said, "is to set up a very detailed index of baroque composers." This index is being done in three steps, the first being compilation of thematic indexes by first lines. "The theme of most works is revealed in the first 10 tones."

Step two is to trace thematic usage and borrowing. Handel, for example, whose index is complete, used some 26,000 themes and borrowed repeatedly from himself.

Step three, according to Zimmerman, is "letting the computer analyze the stylistic 'finger prints' of melodics" to help determine authorship.

In the religion department, Dr. Robert A. Kraft, chairman and professor, is trying to apply the computer to concordance, or indexing work, on ancient Greek texts. Kraft is developing a system to reduce the prodigious amount of hand copying and paper shuffling involved in producing critical texts of the Bible.

"The computer also makes it possible to format the text in different ways" — Greek and Hebrew side by side, for example, or interlinear, he added.

Dr. William Labov, professor of linguistics and director of the Urban Language Survey, has his own Digital Equipment Corp. PDP-11, which has been churning out data on linguistic variables.

According to Gregory Guy, a graduate student in linguistics who is watching the Linguistics Lab while Labov is away for the semester, the computer is "primarily used for vowel analysis. An analyzer gives you an acoustic analysis of speech sounds as they are being spoken."

In Labov's study of black English, the computer was used "for statistical analysis of linguistic variables . . . like the verb 'to be,' " Guy said. "The occasions on which [the verb] is used are often influenced by linguistic and social context."

Not Suited for Job?

In his office at the David Rittenhouse Laboratories, Brody pointed to an advertising flyer he received, noting that "you can now buy the complete works of Virgil in machine-readable form for $30."

What about the objection, sure to be raised, that the computer is an anonymous machine, not suited to the study of the humanities?

"It's an anonymous machine, like a typewriter," Brody said, "but I don't see people rebelling against the typewriter."

Through financial inducements, loans of equipment and lavish attention Brody hopes to make the humanists' first experience with the computer "so sweet, so painless and so cost-free" that they will continue to use it regularly.

Brody explained the reason for the 4341 is that the old computer is down too often and that maintenance costs have been rising "at an alarming rate."

DP Experience

Brody and his colleagues in the physics department have had lots of experience with computers. In fact, the department is the largest user of computer time on campus, using most of that time for high energy physics — a popular specialty among the faculty.

One of the world's leading authorities on the subject, Dr. Alfred Mann, explained that high energy physics needs the time because the discipline is heavily dependent on probability and statistics. To design a detector to verify whether protons ever decay, for example, one must run off a large number of complex calculations, called Monte Carlo calculations, which describe the interaction of the products of the proton decay wtih the material of the proposed detector.

"It is a great deal of computing," Mann said, looking over a thick printout. "If you did it on a little hand calculator it would take forever. On the computer it is a few-minute job."

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To Handle Processing for Eight Banks

User Sticks With Vendor for Four Upgrades

COMMERCE, Ga. — A custom processing firm that serves nine banks in the state of Georgia has moved smoothly through four Burroughs Corp. computers since 1969 — and plans to upgrade to a fifth later this year.

Financial Computer Services, Inc., the first company of its kind in this state, is planning the upgrade to a B 4800 "to help maintain the corporation's steady growth," according to Quay Burket, executive vice-president and general manager.

Founded in 1969, the service firm has increased 170% in total assets in the last five years and 50% in gross billings, Burket said. The bank's assets total more than a third of a billion dollars.

"We pride ourselves on taking a long-range view of the banking requirements of the future and developing innovative programs to meet these requirements," Burket said. "We offer our clients more than just custom processing services. For example, we work with them in marketing programs and we bring in noted speakers on such subjects as banking law and personnel administration."

B4700 Currently Used

A management team of four people and a staff of 25 more employees are presently using a Burroughs B4700 system. "We do full application processing for our banks, including demand deposit accounting, savings, certificates of deposit and installment, mortgage and commercial loans," according to H.A. Owens, vice-president in charge of system programming and development and assistant general manager. Future plans include a bond portfolio application.

"In an average day, we process about 10,000 items," Owens said. "Our main purpose is to tailor our operations directly to the individual needs of our members in all bank operation areas. Every one of our software systems is totally customized to the processing needs of the individual bank."

Financial Computer Services started with a Burroughs B500 system back in 1969. As the corporation grew, larger systems were installed — a B1726 in 1977, a B3700 in 1978 and the B4700 in 1979.

"Our experience in bringing up Burroughs systems has been great," Burket said. "Changing from one computer to another has been very easy. Program changes have been negligible, from our standpoint and from the client standpoint.

"When we installed the B4700 last year, we started at 7 a.m. on a Wednesday after completing our Tuesday evening's work. By 8 a.m. — one hour later — we were up and running. By 11 a.m., everything was settled in and we were on the air. We expect the same experience with the B4800."

Operating System Landed

"One of the reasons we have continued to use Burroughs systems is because of the Master Control Program [MCP]," Milton Summerall, vice-president of operations, said. "Very simply, we can do a lot more processing with MCP and its easy operation than with anyone else's operating system."

The corporation uses Burroughs' Item Processing System and Network Definition Language and Command and Edit software. A central information file will soon be added.

"Our on-line network of teller machines and display systems presently consists of 175 terminals, including TD series input and CRT terminals, TT series transaction terminals and MT series modular terminals and terminal printers," Summerall said. "Within the coming year, we hope to expand this network by approximately 75 more terminals for a total of some 250 by fourth quarter 1980.

"Our furture plans are to expand our radius of operations from our present 80 miles to some 110 miles in the northeast corner of Georgia," Burket added. "We are also looking at establishing a remote processing center for data transmission, capture and front-end editing for batch processing of work, then transmission of the work back to the remote center for printing and distribution."

The corporation presently processes work for The Bank of Toccoa, Cornelia Bank, The Peoples Bank of Winder, The Northeastern Banking Co. of Commerce, The Bank of Clayton, The Farmers Bank of Union Point, The Habersham Bank of Clarksville, the First National Bank of Gwinnett County, Lawrenceville, and The First Bank & Trust of Carnesville. The board of directors is composed of executives from eight of the banks.

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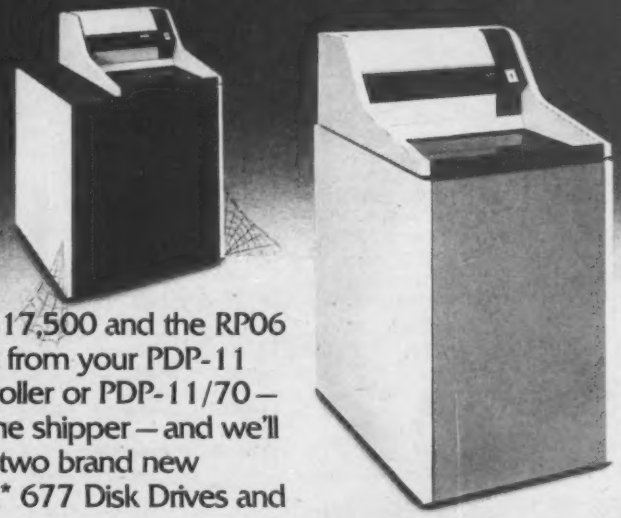

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Expels Punched-Card Processing

School System Graduates to CRT-Based System

ANN ARBOR, Mich. — A computer service center serving 15 local school districts in southeast Michigan saved time and money while increasing efficiency when it switched from a punched card-based processing system to one using CRT terminals for data entry.

The Washtenaw Independent School District (WISD) computer center here had a basic problem of wasted time stemming from the "slow and awkward" method used to transport source data from local districts to Ann Arbor, according to Dave Classon, director of automated processing services.

Furthermore, the center had the same problem in getting the finished processing, paychecks and other documents back to the districts after processing, he added.

"The local districts comprising the WISD cover a substantial geographic area in southeast Michigan," Classon explained. For several years they had been converting source data to punched cards through on-site keypunch machines and delivering the cards by couriers to the WISD headquarters, he said.

There, the messengers — who were frequently the local district's DP specialists — would wait up to several hours while the data was processed and reports prepared.

If the wait was to be excessive, the courier would leave and return later, often adding 60 miles of traveling by doing so, Classon said. Besides a waste of employee time, the system "also made it difficult to correct errors and other discrepancies that were discovered in the data after the couriers had left."

Terminal Solution

Recognizing that a terminal-based system would improve the center's situation, but still held back by high costs and various limitations on such systems' capabilities, WISD continued to tolerate the problem.

It was not until the introduction of the Datapoint Corp. 1500 CPU that the center saw the light at the end of the DP tunnel, according to Classon.

For the comparatively low price of just under $6,000, the 1500 offered 32K characters of internal memory, a CRT screen, typewriter-style keyboard, data communications capability, floppy disk with up to 250,000 char./diskette insert and the ability to interface with an on-site printer.

Concurrent Processing

As required by law, WISD sought bids on its data entry/communications upgrade. Besides being the low bidder, Datapoint emerged as the only equipment with concurrent processing ability, Classon said.

Concurrent processing means that while an operator enters data through the keyboard, reports can be produced simultaneously on an associated printer. "At peak load times this capability is critical in our local district's offices," Classon noted.

Datapoint 1500s with associated printers were installed in all but one of the school districts and connected, via dial-up telephone service, with the WISD mainframe, and Itel Corp. AS-4.

The district's AS-4 system incorporates a 2M-byte central memory, three tape drives, an 1,100 line/min printer and seven disk drive units offering a combined 2.5 billion character storage capacity. The system runs under OS-VS/1, and is geared to accommodate IBM 3780 terminals. Protocol for the 3780 is emulated by the 1500s. An IBM 3705 telecommunications unit, equipped with 20 ports, accepts the preprocessed incoming data from the 1500s via telephone service and queues it for final processing by the AS-4 system.

Application Load

The application load for the NISD service center and its Datapoint network is heavy, covering the administrative needs of almost 66,000 students and 11,000 employees.

Besides payroll, the system is used to input finance and budget accounting data for each of the 15 local school districts. "Probably the most burdensome application load concerns student class scheduling attendance of reporting and administration of programs for students with learning disabilities," Classon noted.

Along with 10 other Michigan intermediate school districts, WISD belongs to Remotely Accessible Management Systems (Rams), a regional association that creates the program for the mainframes operated by the districts. Most of these districts utilize large IBM 360 or 370 systems, as did WISD until it installed the AS-4 system in April 1978.

The Rams-generated programming handles the end processing of data that is entered and edited via the 1500 systems into the AS-4. Currently, there are over 500 programs in the WISD library with more being developed.

Programming for the 1500s, however, has been accomplished by a small group within WISD. "We've created all the necessary programs for the 1500 in-house," Classon said.

Programs are developed and tested in the headquarters operation, placed on diskette media and shipped to the local districts, he explained.

COM System Maker Offers Line Printer Simulator

MINNEAPOLIS — Dicomed Corp., manufacturer of computer output microfilm (COM) systems, has announced a line printer simulator for its D148B and D148C Graphic COM systems.

The initial release of the S505 line printer simulator accepts printer-formatted data from IBM, Control Data Corp., Univac and Honeywell, Inc.CPUs, as well as data intended for other COM devices such as Quantor (NCR Corp.) and Datagraphix, Inc., a company spokesman explained.

Flexibility for character code conversion and carriage control is reportedly provided to meet various standard or user-specified requirements.

Designed to operate with Dicomed's Graphic COM System Control and under Digital Equipment Corp.'s RSX-11M operating system, the S505 printer simulator provides tape label processing, tape resident extraction processing and fixed and variable record lengths (up to 16K byte/block).

Titling and index extraction capability is reportedly provided for NMA standard 24X, 42X and 48X reductions. Features include multirow titling with either normal or reversed characters extracted from header records, data pages, stored system files and input via the system console.

The S505 Printer Simulator costs $47,500 and is available immediately. Versions for Burroughs Corp. and ICL, Inc. will follow shortly. Dicomed is at 9700 Newton Ave., Minneapolis, Minn. 55431.

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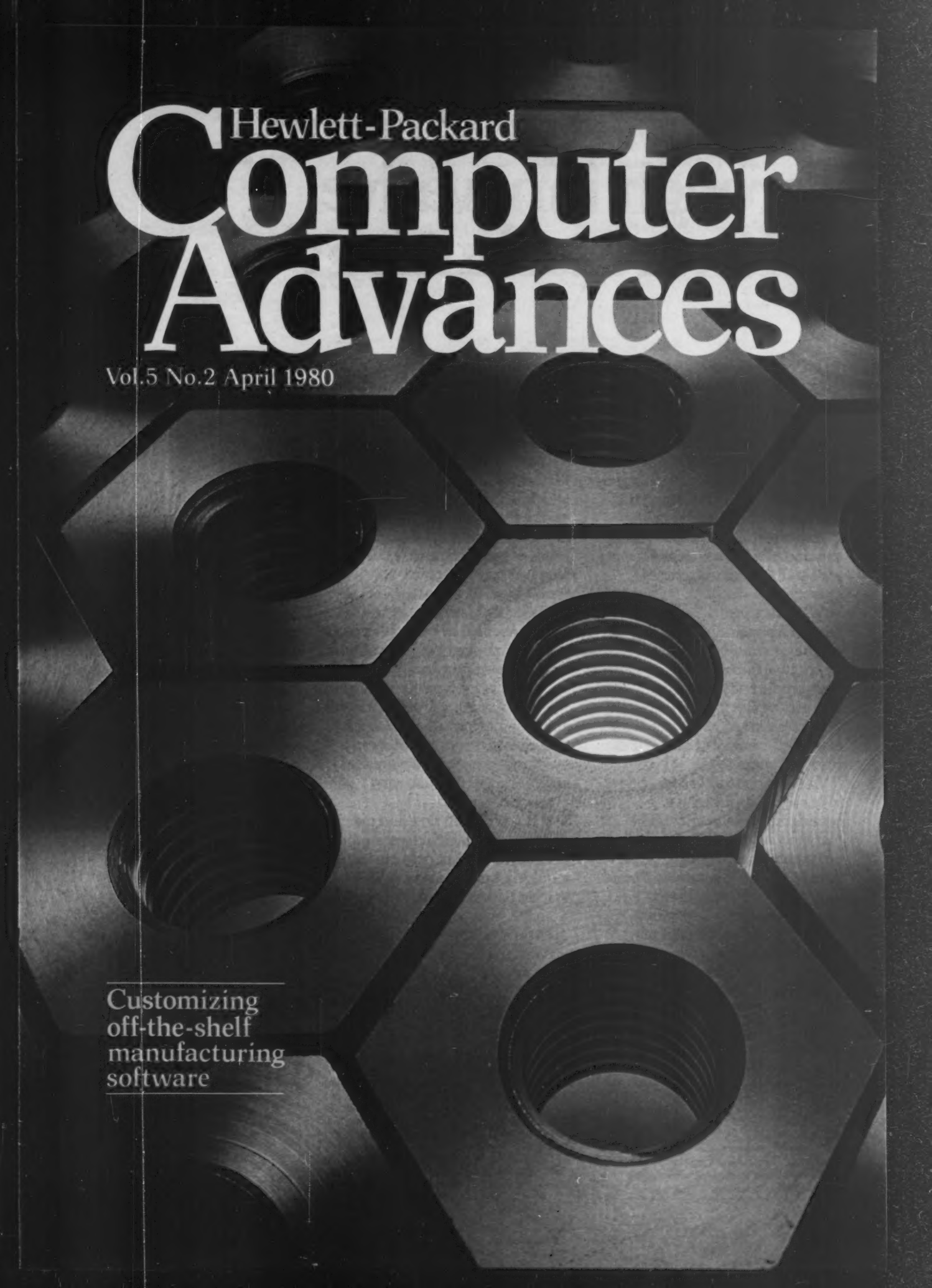
Computer Advances

Vol.5 No.2 April 1980



Customizing off-the-shelf manufacturing software

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In today's business environment, many manufacturers are facing the significant challenges of improving their productivity. Cost pressures, resource planning, inventory management, production line efficiency, and shipment scheduling are all factors familiar to anyone involved with manufacturing management. These challenges demand effective solutions for every aspect of your manufacturing operation.

With the recent advent of computerized application software systems, manufacturers now have an effective means of addressing their productivity problems. Two alternatives are most common—either develop software solutions in-house, or purchase off-the-shelf standard packages.

Applications software developed in-house can be expensive, considering the amount of time that must be devoted by company programmers to writing it. Another trouble with do-it-yourself software is that it can require extremely lengthy lead-times to develop. Once written, it is often inflexible and costly to change, requiring sophisticated programming skills to make even the slightest program modification.

On the other hand, many off-the-shelf manufacturing applications software packages available today can also be inflexible, restricting your implementation to someone else's design.

Now, Hewlett-Packard is offering a new concept to the industry—Materials Management/3000—which allows all the benefits of the off-the-shelf software with the flexibility to meet the changing needs of your business. It can go a long way toward solving your "make-buy" dilemma.

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It can save both time and money and improve manufacturers' productivity; users not only can install it quickly, but can also modify it to meet their needs, and still benefit from the advantages of HP standard product support, updates, and maintenance.

◀ *Cover*
New materials management applications software from Hewlett-Packard can be uniquely user-customized to meet specific needs of a manufacturing company.

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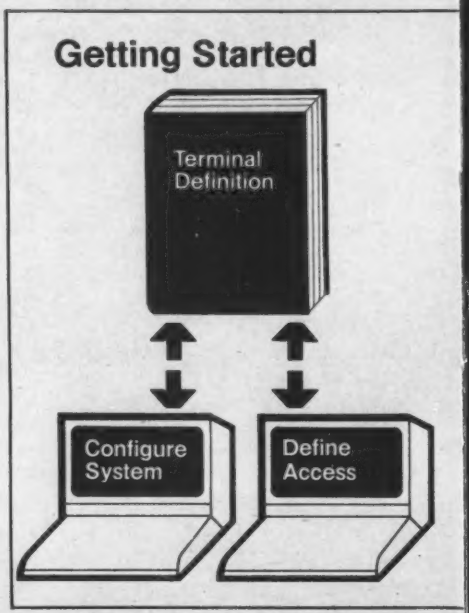

To process any transaction, Materials Management/3000 interacts between the application code and dictionary. For example, in order for the system to check security, the dictionary is read for a security definition for each user. In order for an application to read the information entered on the screen, the dictionary provides the layout of the screen. If the data fields must be edited, the dictionary gives a definition of each field. And to update the data base, the dictionary contains a layout of each data set. ▶

operating expenses. Designed for use on HP3000 computer systems, it is a completely interactive, database-oriented tool that helps you effectively deal with the complexities of managing your materials.

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Reduced inventory investment

Materials Management/3000 makes available the information necessary to help manage your materials inventory. By combining the disciplines of accurate master scheduling and complete product description with the on-line tracking of inventory and order status, it generates the data required to build a material requirements plan. In turn, this plan provides the basis for reducing your inventory investment as a percent of sales.

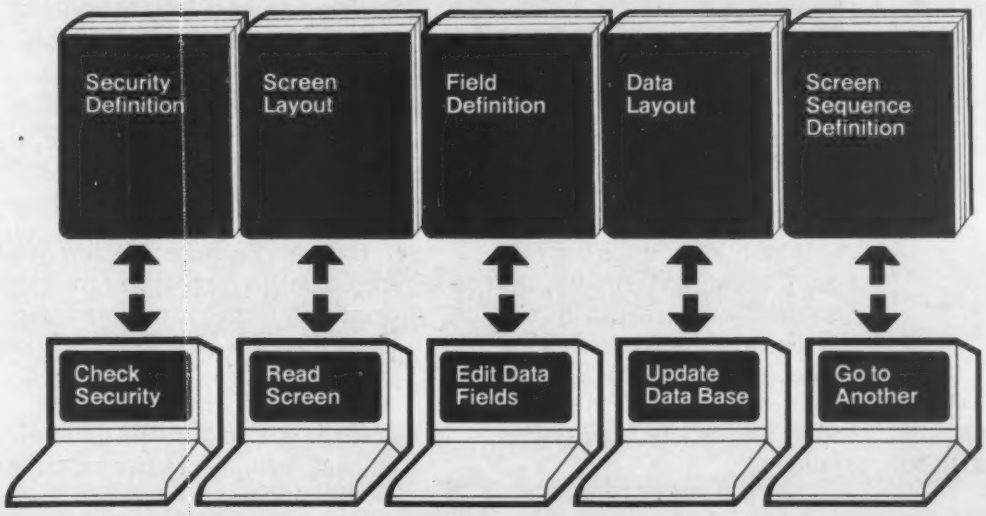
With reduced inventory requirements, capital can be freed for use in other areas of your business. In addition, total inventory carrying costs—which can often run as high as 50% of the inventory investment—can be substantially decreased.

I'm not a programmer. Can I use it?

Materials Management/3000 provides the means by which the

Continued on page 4

Processing a Transaction



Customizing Materials Management/3000

Continued from page 3.

user—not necessarily a professional computer programmer—can tailor the program to fit the application. And, in the event your business changes or grows, the program can easily be retailored to suit your growing needs.

Some of the numerous advantages to this software technology approach you may receive by installing Materials Management/3000 are:

☐ The solution can be made to fit your company, requiring a minimum of changes in your way of doing business.

☐ Implementation time is short. This ensures a quicker and less-costly realization of the benefits from your manufacturing control plan.

☐ There is a lower cost of ownership through reduced development costs...also Hewlett-Packard will completely support and maintain the entire solution, including both hardware and customized application software.

But is it easy to use?

User (or terminal operator) functions have been designed to be easy to use. With only simple instruction, the customer will be able to enter, retrieve, and modify data via an easy-to-use HP 2640-Series interactive CRT terminal.

Easy operation is made possible by such design features as direct keyboard function keys to choose menu selections rather than entering lengthy transaction codes to establish information flow.

By calling up a variety of HP designed, but user-modifiable forms, a user can easily simplify many of the tasks associated with materials planning and control. To guide the operator in making entries, on-line transaction "menus" are displayed in sequence on the terminal screen. If the user is unsure of the proper entry, a "help" button provides assistance.

What about flexibility?

Behind the relatively simple operational procedures of Materials Management/3000 lies a versatility not found even on much more expensive systems.

In addition to its on-line data entry, update and retrieval, and customizable software capabilities, the system also automates batch job scheduling, manages backup and archival tapes, and can automatically recover jobs from system failures.

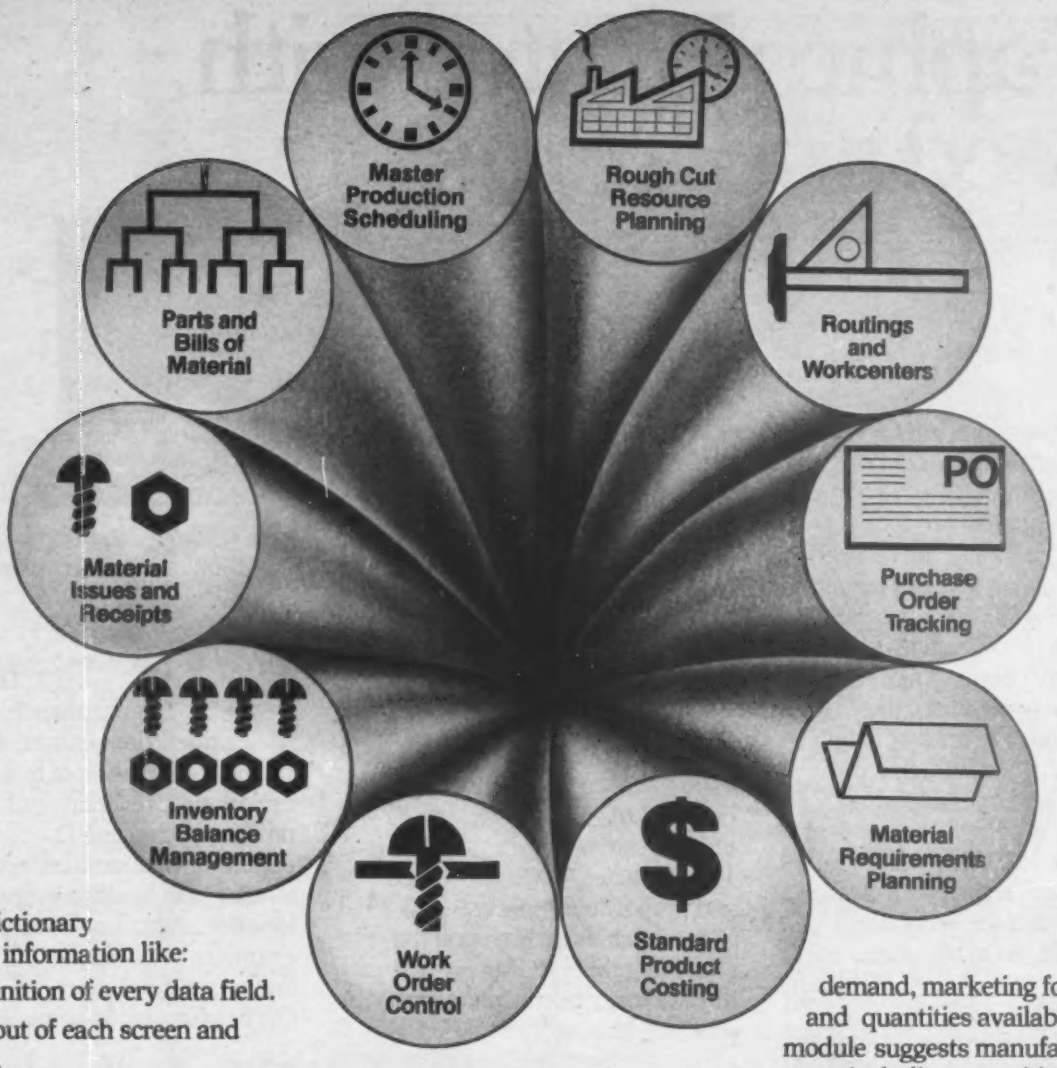
As a security precaution, passwords can be specified by the customer to allow access by only those persons authorized to update or review specific types of information.

For additional security, the system directly controls all application terminals, allowing only those to whom the customer's system administrator has given proper authorization to operate at the specified times.

How does it work?

Simply stated, Materials Management/3000 is implemented by separating an *application dictionary* from the traditional *application code*. While the application code is normally an unchanging set of logic defined by the task the user wants done, the application dictionary is really a definition of all the customizable information in the system, which can change according to the varying needs of the application and the company.

For example, since we know that the length of a part number can vary drastically from one manufacturer to another, this type of information goes into the dictionary. However, such standard application procedures as how to calculate the total on-hand quantity of a part based on receipts and issues are stored in the code.



The dictionary contains information like:

- ☐ A definition of every data field.
- ☐ A layout of each screen and data set.
- ☐ Security for each user.
- ☐ A definition of each terminal's capabilities.
- ☐ Screen sequencing.
- ☐ Job schedules for all batch jobs.
- ☐ System values (the frequency of cycle counting parts, for instance).

Actually, the dictionary is an IMAGE/3000 data base (HP's award-winning Data Base Management System), and provides the information needed whenever the application is being run.

In effect, what HP has done is to eliminate the arduous programming steps necessary to change the application code. In addition to separating the application dictionary from the programming logic, HP made the dictionary easy to modify, and therefore more accessible to the appropriate user.

What are the modules?

In Materials Management/3000, the user gets a total of ten application modules, each of which is customizable and provided as part of the entire software product. Together, they represent the most significant stages of materials planning and control:

Master Production Scheduling

This module aids management in deciding which end products should be produced, how much, and when. Based on customer demand, marketing forecasts, and quantities available, this module suggests manufacturing runs, including quantities and starting dates.

Rough Cut Resource Planning

Designed to compare the amount of those labor, capital, and material resources determined by the manufacturer to be critical in carrying out the Master Schedule against the resources actually available, this module enables management to catch resource "bottlenecks" that may prove both unrealistic and costly to a manufacturer.

Parts and Bills of Material

This module defines what and how many parts combine to form other parts or products. It includes descriptive, cost, and planning information about each item, and how the items relate to each other. Once a bill has been defined for an

Continued on page 8

Graphics Printer with speed and forms

The first of a new family of high-speed, non-impact printers, Hewlett-Packard's Model 7310A is versatile enough to produce not only fixed, proportionally spaced, and embellished text, but forms and graphics as well.

Designed for speed (up to 500 lines per minute) and high resolution (100 dots per inch), the 7310A is quiet enough to operate in an office and rugged enough for a laboratory and manufacturing environment.

With the 7310A, forms or graphs can be set up on the user's video terminal to include every detail, then transferred to the printer as they appear on the screen. Typically, a full page report will take 5 to 20 seconds from computer memory, depending on the number of print enhancements used. Full screen graphics from an HP 2647A or HP 2648A graphics terminal will print in 47 seconds.

And when finished, the 7310A automatically trims printed pages to any standard length—8½" x 11," European A4 metric dimensions, or any programmed length from 2 to 20 inches—all neatly stacked.

No matter what your printing needs, there's a good chance that the 7310A will meet the challenge. For instance, the 7310A can be interfaced to many alphanumeric and graphics terminals, or to desktop and small computer systems—even those not manufactured by HP.

In the text mode, the user can employ a total of 30 character sets at any one time. This is accomplished by loading six ROMs (read-only memories) into the printer—three are dedicated to two 128-character ASCII sets (fixed and proportional spacing) and 25 Roman Extension sets, and the remaining three ROMs provide three of four optional character sets.

☐ For fixed or proportional spacing, a corresponding full 128-character ASCII set does the trick. With proportionally spaced text, lines can hold 15-20 percent more characters, resulting in greater capacity in addition to a more pleasing appearance.

☐ To accommodate the need for international languages, as well as special HP 9825A desktop keyboard symbols, there are 25 separate HP Roman Extension character sets, each of which is selectable at any time as the primary or secondary alternative via a simple escape sequence.

☐ The four optional character sets that are available include HP 2640 terminal-series line drawing and math sets, APL (A Programming Language) symbols, and Japanese Katakana characters.

☐ The 7310A can enhance headings, titles, data-entry fields, or any combination of text by underlining, reversing (white text on dark background), or printing in regular or boldface characters. And all three can be done in any combination, either line by line or character by character. Differential line spacing and extended character line heights are also programmable.

Printing it with dots

Perhaps one of the most significant advancements of the 7310A is its ability to print graphic images and forms at very high speed from information created and stored in a computer or "raster" graphics terminal.

Obviously, it takes less time to print simple text than complex graphics or even embellished or proportionally spaced text. The reason for this can be seen in the way the 7310A handles the actual printing.

In any one line, the 720 dots across the page (exactly the number in HP 2640 Series displays) are divided into 9-dot segments, each of which is part of a 9x15-dot character cell. When printing standard text with fixed spacing, however, the 7310A only concentrates on the information contained

within a 7x9-dot interior matrix that contains the alphanumeric character.

With fewer dots to worry about, fewer thin-film resistor elements (to burn in the dots) have to be addressed, hence the rate of printing can be speeded up. Since proportional spacing introduces more characters to the line by narrowing the 7x9-dot format for smaller letters and numbers, it requires more processing, therefore the printing rate is slower.

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OPERATION DESCRIPTION

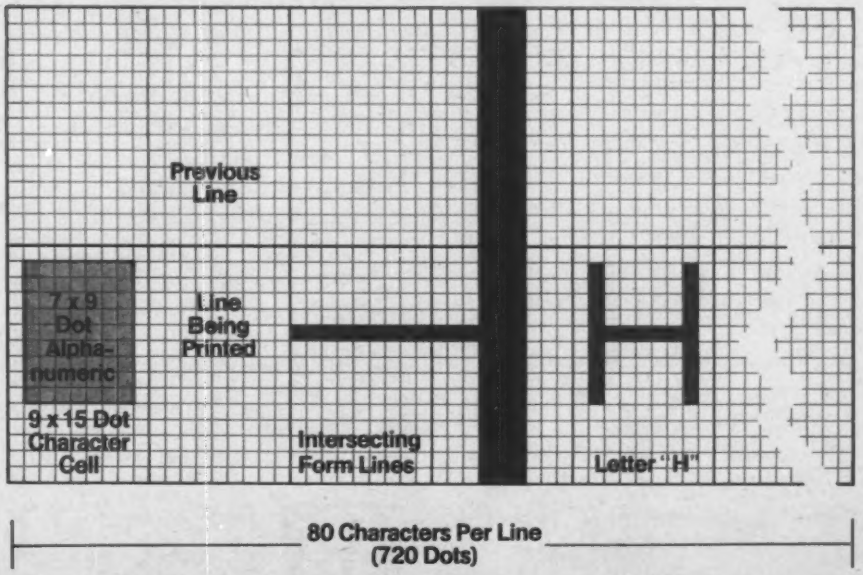
PART NUM	PART NUMBER							
"X" Motor Assembly	05227-60120	R	1	1	10	3	1.00	.000
Frame-Accelerometer Mount	05227-40040	B	2	1	10	3,5		
Elastomate-Short	T-32446	C	2	1	10	3,5		
Elastomate-Long	T-32447	D	2	1	10	3,5		
Transducer Assembly	05227-60020	E	2	1	10	3,5		
Cable Assembly - "X" Motor	05227-60010	F	1	1	10	3		
Stmpg-"X" Mtr. Accelerometer	1600-0745	G	1	1	10	4		
Bumper "Y" Support	05227-40060	H	2	1	10	4		
Wire WH/YEL-W/Solder Lug	05227-60050	J	1	1	10	3		
"Y" Motor Assembly	05227-60121	K	1	1	30	5		
Cable Assembly - "Y" Motor	05227-60011	L	1	1	30	5		
Clamp "Y" Mtr. Accelerometer	1600-0746	M	1	1	30	6		
Plate-Pen Solenoid Mounting	05227-40043	N	1	1	30	5		
Solenoid-Pen Lift Assembly	05227-60042	P	1	1	30	6		
Wires WH/YEL-WH/RED	05227-60052	Q	1	1	30	5		
	05227-60051	Q	1	1	30	5		
"Y" Stator Assembly	05227-60006	R	1	1	50	7		
Support "Y" Cover Front	05227-40001	S	1	1	50	7		
Bumper Stop (Small)	05227-40015	T	1	1	50	7		
"Y" Arm Support	05227-20018	U	1	1	50	7		

Actual size sample. Headings, titles, data fields, or any variety of text may be embellished either line for line, or character by character. Bold face, extended height, reversed printing, and underlining — all contribute to the new high speed printers overall impact in obtaining total text, forms, and graphic capabilities.

More for the money

For maximum flexibility, the 7310A Text and Graphics Printer is available in four standard interfaces: standard HP-IB (IEEE-488) for HP graphics terminals (2647A, 2648A, and 2649I), desktops, and small computers; 8-bit duplex for HP alphanumeric terminals (2640B, 2641A, and 2645A; and RS-232-C and RS-423-A for remote printing applications on many computers.

For complete confidence that the 7310A is operating properly, a convenient rear-panel button is used to test all internal memory circuits. Should a failure be found, diagnostic patterns quickly help to locate the problem.



To assure reliable performance, print heads (there are six fixed heads arranged in a line in each machine, each with 120 printing resistors on 0.01" centers) have demonstrated an average life of over 40,000 pages of printing. If a print head should fail, however, it can be replaced, adjusted to proper alignment, and put back into service within 30 minutes.

To suit varying needs, a continuous roll of either black-on-white or blue-on-white thermal paper is available in widths of 210 mm (ISO A4) or 8½". To load, the user merely drops a roll of paper into the tray, closes the panel, and pushes the "top of form" button. From this point on, the 7310A takes over; it rotates the free end of the roll into paper guides, cuts and advances the paper into printing position automatically, and even stops printing at the end of the last page to wait until a new roll is inserted before resuming operation.

The basic price is $4750*; circle B on the reply card for descriptive literature.

*USA domestic price only

Materials Management/3000

Continued from page 5

assembly, it may be used for other products without redefinition.

Routings and Workcenters

This module describes the locations where parts, assemblies, or products are made (workcenters) and the sequence of operations in which they are made (routings). In addition, a user may enter descriptive, cost, and planning information about each workcenter.

Material Issues and Receipts

This module controls stockroom inventory by processing all of the activities that affect inventory balances. These include receipt of purchase orders and workorders, material issues, backorder filling, and maintenance of the audit trail.

Inventory Balance Management

This module is responsible for keeping track of the warehouse locations where inventory is stored, and manages inventory balances, cycle counting, and inventory locations. In this way, the amount and location of any stock can be ascertained, no matter how many locations it has been assigned.

Work Order Control

A work order is an internal factory authorization to build a specific part or assembly. This module determines planned issues by using the bill of material, monitors these allocations, and tracks scheduled receipts. It can detect shortages before they occur and begin to affect the production plan.

Purchase Order Tracking

Purchase orders represent future supply or scheduled receipts for the items being purchased. This module monitors such activity, maintains vendor information, and provides data on purchase order commitments.

Material Requirements Planning

This module generates the materials plan, recommending what and how much to order and when to order it. It accomplishes this by analyzing data from the master schedule, bills of material, inventory, and purchase orders.

Standard Product Costing

This module gives the manufacturer the capability of calculating the costs associated with each product at every phase of the production line through to completion.

Your partner in productivity

Installing an on-line, data-base-oriented materials planning and control system can easily turn out to be the single most important operational change a manufacturing company can make. It's important, therefore, that you have the support and experience of someone you can trust. As an experienced manufacturing and computer company, HP has been providing solutions for itself and its customers for many years.

Building upon the experience of HP's successful MFG/3000 (in use at many customer sites since 1978), Materials Management/3000 represents the newest thinking in applications software technology—systems that can be modified to match the application.

You have a means of achieving the benefits of materials planning and control without major changes to your business style. It means obtaining what may be considered the most adaptable and cost-effective computer software available today. It means knowing that you may have acquired an edge on your competitor with a system that can increase your productivity and save you money.

And, finally, it means that you can depend on a single vendor —Hewlett-Packard—for help in an increasingly competitive manufacturing marketplace.

The cost of Materials Management/3000 is $25,000. If you would like more information on HP's Materials Management/3000 software system, check A on the reply card.

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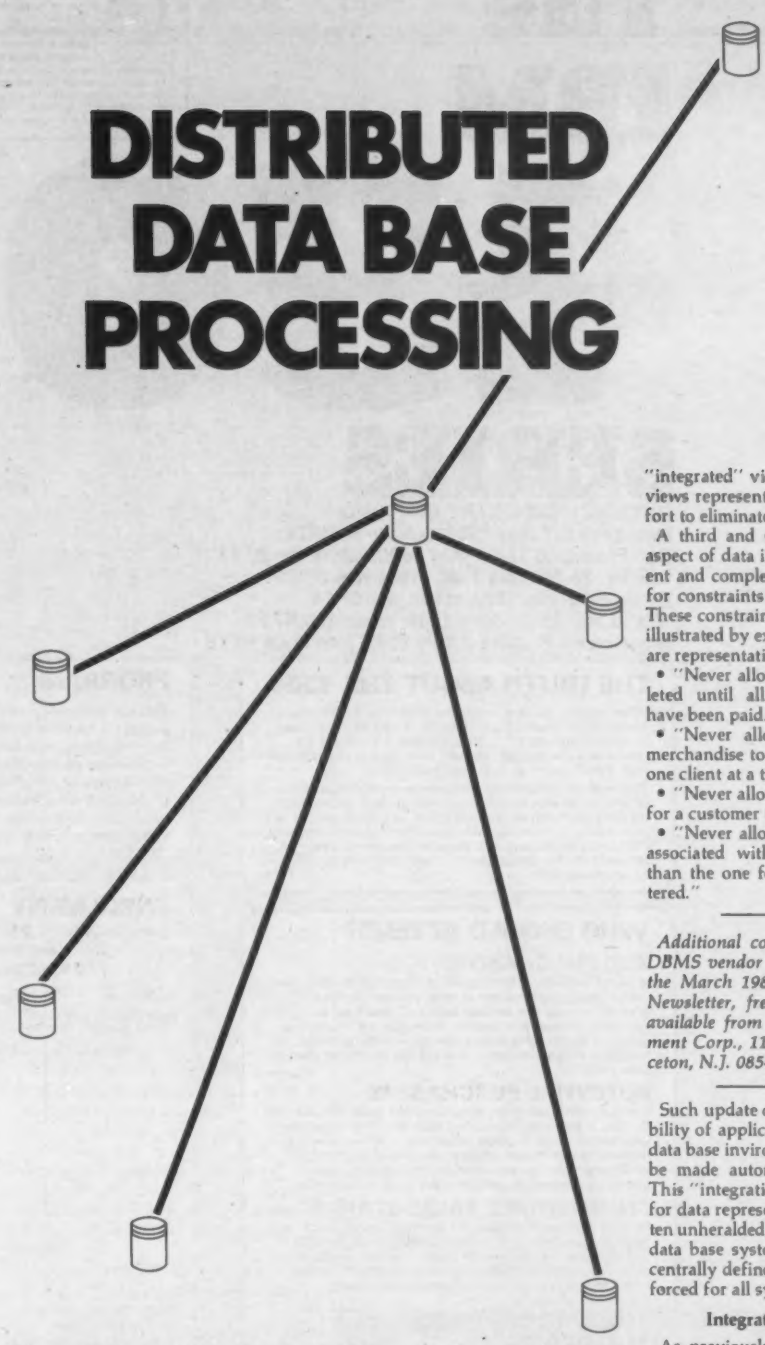
DISTRIBUTED DATA BASE PROCESSING



The author develops a scheme for analyzing the data base capabilities of distributed systems and uses it to classify the software offerings of a number of vendors including IBM, Cullinane Corp. and Infodata Systems, Inc. He then predicts how the data base capabilities of future distributed systems are likely—or unlikely—to develop.

By Ronald G. Ross

Anyone who has kept even half an ear tuned to recent talk of future systems knows that as the industry surges into the 1980s, one of the hottest technological issues is the concept of distributed processing.

Now that IBM has put its stamp of approval on the idea via the 4300, the notion is that distributed processing will solve virtually all the data management ills of a corporation, as if by magic. "Distribute your data base" has become the battle cry of a whole new consortium of large and small vendors. Unfortunately, the idea is running amok.

A realistic assessment of the state of the art in distributed data base processing will show that *no* vendor can presently deliver its users that piece of the distributed pie. In terms of currently available software packages for computer networks, there is no such thing as distributed data base processing. Nor are any commercial offerings likely soon. A careful examination of some old and trustworthy data base concepts, followed by some hard thinking about IBM and the DP industry, will readily show that this is the case.

A Data Base Fundamental

As all data base professionals — and most vendors of data base management systems (DBMS) — will tell you, one of the key ingredients in data base technology is the conept of data integration.

Data integration actually represents a family of concepts, all of which derive from the general objective of creating a logical and comprehensive view of a data resource.

First of all, data integration disallows data redundancy — or at least any data redundancy that is immediately visible to end users and programmers operating in the DBMS environment. The idea is that multiple copies of the same data, or files whose content partially overlaps, cause all kinds of updating and coordination difficulties. Data that is duplicated loses integrity unless very tedious and error-prone procedures are manually undertaken to rectify discrepancies at each step of the processing cycles.

A second concept in data integration is the idea of global data views that simplify (at least in theory) application requirements involving complex relationships and value cosntraints on access. DBMS provide a variety of intricate mechanisms, such as pointer, sets and coupled indexes, to support these "integrated" views. In a sense, global views represent the flip side of the effort to eliminate data redundancy.

A third and somewhat more subtle aspect of data integration is the inherent and completely automatic support for constraints on data base updates. These constraints, or "rules," are best illustrated by examples. The following are representative cases:

- "Never allow a customer to be deleted until all outstanding invoices have been paid."
- "Never allow the same item of merchandise to be leased to more than one client at a time."
- "Never allow an order to be placed for a customer that does not exist."
- "Never allow a credit record to be associated with any customer other than the one for which it is first entered."

Additional comments on DDP and DBMS vendor issues are contained in the March 1980 issues of Data Base Newsletter, free copies of which are available from Performance Development Corp., 1101-P State Road, Princeton, N.J. 08540.

Such update checks are the responsibility of application programs in non-data base invironments; they can often be made automatic under a DBMS. This "integration" of the update rules for data represents an important, if often unheralded, productivity benefit of data base systems. Such rules can be centrally defined, then universally enforced for all system users.

Integration Alternatives

As previously suggested, data integration or its equivalent need not necessarily take place withing the domain of a DBMS. It can actually take place at any of several levels in an overall system architecture, depending on the sophistication of the system and the integration burden the user is willing to accept. The DBMS is simply the best alternative in an overall system architecture for its support.

The situation can be viewed another way. Data has always been "distributed" in that it has always existed on different devices, within separate files, under distinct formats and/or under the control of distinct applications. Even with data base systems, data may sometimes exist under multiple schemas or, in the extreme, under the control of multiple DBMS.

(Continued on In Depth/3)

The IBM 4300 SERIES

Frederic Lamond worked for five years in market research at The Economist Intelligence Unit before joining the computer industry in 1980 as a Senior Systems Analyst for Univac. Since then, he has been employed as Export Sales Consultant and Technical Support Manager for English Electric Computers, Technical Consultant at Leasco Systems and Research, and European Editor of the Auerbach Computer Technology Reports. Since 1975, he has combined his regular contributions to the international computing press with a growing consultancy activity. He has recently undertaken an intensive study of the 4300 series for a major client.

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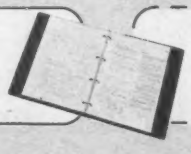

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DISTRIBUTED DATA BASE PROCESSING

IN DEPTH

(Continued from In Depth/1)

With the advent of computer networks and distributed processing, one more complication in the pattern of data distribution can occur: There can now be many CPUs instead of just one. These multiple CPUs become simply one more factor in the equation used to balance data integration.

If data integration is to be automatic in any overall system architecture, by what point must it occur? Obviously, it must happen at any point *before* the user receives data for a query. If it has not happened by that time, the user will have to produce it himself. In other words, the user will have to enter separate transactions until the integrated view he needs (which apparently the system knows nothing about) has been produced.

Even where the integration is "automatic" from the end user's point of view, the actual process that creates it can occur at any of several internal levels. The most obvious alternatives, of course, are the application programs and the DBMS.

Satisfying a Query

Figure 1 shows the various components of an overall system architecture that become involved in the satisfaction of any given data query. Also shown is division of these components into three alternative levels for data integration activities. These levels and their respective components are essentially the same for both distributed and nondistributed environments.

At the first level, transaction routing, the user himself is responsible for integrating data. The transaction monitor may assist the user by masking the *physical* aspects of data distribution, even the existence of multiple CPUs, but it cannot (at least as currently conceived) mask the *logical* fact of data distribution. At this level, assuming no action has been taken at either lower level, the user himself must produce data integration.

The second level, the application system, shifts the burden of data integration away from the user. This, of course, is a predominate characteristic of non-DBMS applications. All their struggles with sorts and merges, file look-ups and spin-off files are conceptually centered on the ambitious, if often ill-fated, effort to produce integration.

How does the application go about creating data integration? In a strictly technical sense, to produce an integrated view, the application system must take each transaction from the user and translate it into many internal transactions and/or operations.

Although normally the needed data would be kept in sequential or indexed-sequential files, it is conceivable that some of these transactions or operations might be directed toward multiple data bases and even multiple DBMS of the same or different type. Given intelligent data base and application design, it is unlikely that this would happen on a single machine because if a DBMS is present, it can be assumed that a single DBMS copy should be producing the data integration itself automatically.

Given the complication to data distribution of machine networks, however, *it becomes much more probable that the application system will have to pursue cross-data base and cross-DBMS data integration itself.* In other words, especially for networks, the presence of a DBMS does not always solve every aspect of data integration. This is a crucial point.

Third Level

For any data under the immediate control of the DBMS, however, the third and final level in Figure 1, data integration, can be produced automatically. Actually, there is always a third level in an automated system,even if a DBMS is absent, since all (or most) application systems use vendor-supplied file access methods. Where a DBMS is present, these access methods generally fall under its control, to be used internally, rather than under the control of application programs. In general, level three is that part of the overall system where transactions are finally serviced, that is, translated into data.

The existence of a DBMS at the third level means a number of devices (including sets, pointers and indexes) will be used to integrate automatically data distributed across files. This operates smoothly so long as the data distribution occurs only on one CPU. As will be shown, it does not work so well when more than one CPU is entertained.

Evident in the three levels just described is the potential for successive submerging of the awareness of logical data distribution.

The first level is primitive; the user must manually manipulate data so that an integrated view is possible. The second level is better; at least the end user is not required to produce it. Obviously the third level is the best of all. With a DBMS, data integration is produced automatically so that application programs need not pursue it themselves.

This submerging of awareness toward the DBMS has important implications for boosting productivity in the task of building application systems. Ironically, improving productivity is also one of the basic objectives posited for distributed systems. Unfortunately, at least given the state of the art likely for the not-so-immediate technological future, each of these two means of approaching the same objective may in fact operate to the detriment of the other.

In other words, to go "distributed" may mean to some extent surrendering data base advantages, as well as the reverse also being true. A closer look at the problems of DBMS in the distributed environment will help establish the technical reasons this must be so.

DBMS Technology Limits

In data base systems, all questions of integrity (the correctness of data values) are arbitrated and resolved by a

(Continued on In Depth/4)

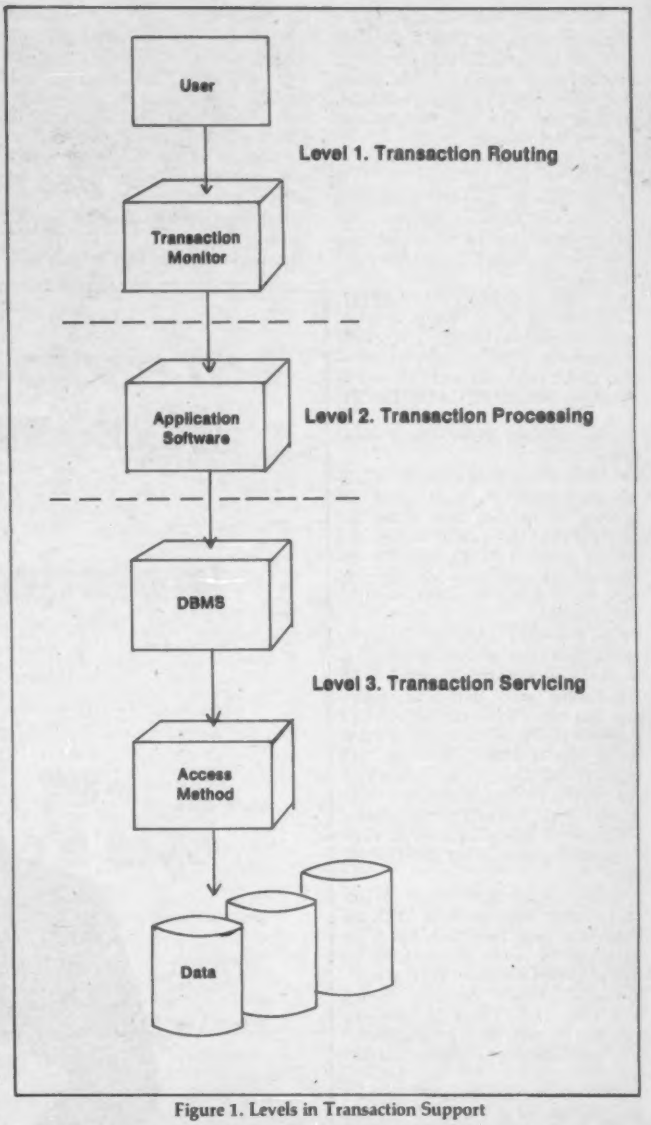
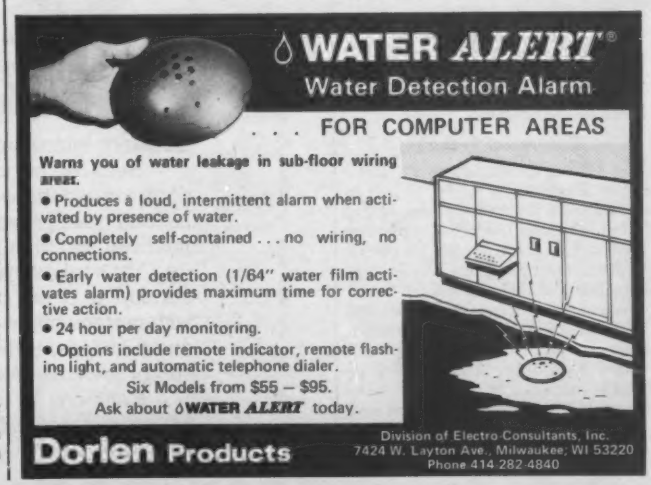


Figure 1. Levels in Transaction Support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single authority, the DBMS. Since the CPU on which the DBMS operates is a strictly serial processor, this means that all types of arbitration and resolution can take place in an orderly, unidimensional fashion.

The following areas of operation illustrate:

- For controlling concurrent update request, the DBMS/CPU team can lock a record, update the content and then remove the lock. No normal event can intervene.
- In case of deadlock, the DBMS/CPU team has all the pieces of information it needs to identify and resolve the impasse. (This includes information about run-units and the records they have locked.) All the DBMS/CPU team has to do is to analyze the riddle until reasons for delays present themselves.
- For recovery from any type of failure, the DBMS/CPU team knows that nothing in its data base realm has changed since the onset of failure. The web of events it must untangle to restore normal operations may be complex, but at least it knows the web has been constant.
- In providing users and programs with global views of the data base (that is, in supporting data integration), all information about data relationships and data types is coordinated within a single directory, which stands as a unit under the DBMS/CPU team. All pieces of this directory are always kept completely in synchronization with the data base, because all definitional actions must take place with the first-hand participation of the DBMS/CPU team.

All of these tidy conveniences drastically change when multiple CPUs are brought to bear. Essentially lost is the advantage of easily guaranteeing (a) that all events are serial; (b) that environments remain constant during downtime; and (c) that the data-base directory as seen by a given DBMS/CPU team is always complete and current.

All these changes occur because of the very essence of a network: the fact that a network consists of a collection of simultaneously executing machines, any one of which can fail without more than minor disruption to the others and over which data base files and software management components are distributed.

Problems of Integrity

For DBMS this translates into difficulties at two levels, both of which can cause significant problems of integrity.

First, of course, the actual content of the data base is distributed. This is the level that most people mean when they talk about data distribution.

Second, knowledge *about* the data base is distributed. This level is much more subtle, since it is "hidden" within the DBMS. Since this knowledge is contained in a directory, however, which is actually itself a data base of sorts (some people prefer to call it a meta-data base), the integrity problems are ironically very similar for both levels.

Distribution at either level can occur under a variety of schemes. Partitioning, replication, centralization and combinations of these are all possibilities commonly discussed. How will the collective DBMS (the DBMS that is the sum of all its distributed parts) now resolve questions of integrity at each of these two levels?

Some examples help illustrate the potential problems.

Deadlock. Suppose user X locks record 1 on machine A, then attempts to lock record 2 on machine B. Suppose in the meantime that user Y locks record 2 on machine B and then attempts to lock record 1 on machine A. The result, of course, is an intermachine deadlock.

If both users and both records had been on the same machine, the DBMS/CPU team could have resolved the difficulty by rolling back one run-unit or the other.

But what happens now with two DBMS/CPU components? What do the components do to determine that the deadlock exists? Which one takes remedial action? What if they both take remedial action?

These problems are certainly difficult, but perhaps still solvable. What happens when *many* CPUs and *many* locked records are involved?

Duplication. Because of the cost and slowness of transmission methods, in many cases it may be desirable to duplicate certain portions of a data base

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on more than one node of a network. (Data base concepts do not preclude such duplication so long as its existence is transparent to all users.) The DBMS must, of course, assume responsibility for maintaining the equivalence of data values across all nodes to ensure overall data base integrity.

Suppose in a company's inventory system, record A specifies how many widgets are in current supply. The company has several major business offices, and it is deemed desirable to keep a copy of record A at each site. Record A currently shows that only one widget is in supply. Buyer X at office 1 requests a widget at the same time buyer Y at office 2 also makes a request.

Obviously the widget cannot be sold at both offices even though the local inventory records at each deem a widget available. How does the distributed DBMS tackle this difficulty?

One method is to lock every local record and to apply the update (presumably corresponding to the sale attempted first) to each. Since the sales were attempted more or less simultaneously, this presumes that the distributed DBMS can solve any deadlocking that might have occurred as each local DBMS/CPU team first locked its own record copy, then attempted to extend its control over others.

Obviously this complex situation may require considerable time and many intermachine transmissions to be solved, assuming that it could be solved at all. Response time is likely to be slow. From a data base processing perspective, at least for this type of application, some doubt is cast on the true practicality of data distribution.

In applications where update turnaround is not a critical concern, an alternative method is possible that avoids the locking and deadlock difficulties. In this method, transactions are not immediately applied to local or "foreign" data bases, but rather are time-stamped and held until it becomes apparent that no preceding transactions have been entered anywhere in the network. When this is evident, the transaction is then applied.

Looking at the network as a whole and assuming that all nodes share time-stamped transactions with all other nodes, all data base copies in the network gradually acquiesce to the same ultimate state, although at any given time their progressive states may differ.

The implications are twofold. First, for a given user at a given location, the time lag in the application of a transaction may be significant. Second, since local data base copies are out of synchronization with each other and with the hypothetical "latest" data base copy, decisions may be based on information that is not fully accurate. In other words, there may be many significant hazards to integrity.

Other approaches to the problem of maintaining the integrity of duplicated data base copies have been suggested; unfortunately, each has its limitations.

Data Structures. It was previously mentioned that the distribution of data in distributed data base processing systems really occurs at two levels — first at the actual data base level and second at the data directory level.

The latter is easiest to visualize if the directory is considered an inventory for the data base, specifying in particular how many entities of what types are where. Once this special inventory data base is distributed, any of the types of problems mentioned above can reoccur at this "higher" level.

Suppose, for example, that a set of records crosses machine boundaries. Suppose also that this set is implemented by an index of pointers (this is the directory component).

In the directory distribution scheme, the index may be either partitioned or replicated between machines.

How does the DBMS solve simultaneous update attempts? How are deadlock situations between DBMS/CPU components resolved? What are the recovery steps when one or more DBMS/CPU components go down, and what updating is permitted in the interim? How is the set reorganized? How can the DBMS make certain that all update constraints are consistently applied?

These are not idle problems. Any distributed DBMS must be able to solve them in a global and timely fashion. No currently available DBMS can yet do this. These areas very correctly represent limits to current data base technology. To the user of distributed sy-

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tems, these limits mean a retreat from totally automatic data integration.

Definitions, Classifications

Recent industry communications have highlighted the instances of major corporations "distributing" their data bases by purchasing and installing minis and mid-sized systems for their branch offices and plants. Often, there is no real-time communication between these distributed locations; if there is any integration of the distributed data, it occurs off-line by non-electronic means. (One can visualize integration occurring by nightly carriers, speeding files by truck through city streets at the hardly overwhelming rate of .5 byte/sec).

Applying the term "distributed data base" to such a strategy treads on very shaky conceptual ground. Two things are wrong. First, integration cannot occur in real time, even if the end user is willing to do it himself.

Second, even if any global view of data in the network exists, it cannot be directly expressed. In other words, even though data may be relatable across several nodes, or though there may be meaningful constraints on data value updating that should be applied, these cannot be operative within a reasonable amount of time.

What constitutes a reasonable amount of time? For the majority of applications, it is less than 24 hours (the average turnaround time by nightly carrier); for many applications, it is actually no longer than an end user should be expected to sit at a terminal, waiting for a response to one or several transactions.

So unless a network exists and transactions and responses can travel to and fro between nodes in real time, it is safe to say that distributed data base processing has not really occurred. Actually, the organization has simply *decentralized* its data processing. Even the term "distributed processing" is unduly flattering.

Appropriate Use of Terminology

When are these stronger terms appropriate? Described above were three levels to which the successive submerging of logial data distribution awareness might fall. What these levels really imply are three successively more powerful or automatic means of producing data integration. Each of the three levels implies distinct software capabilities and configurations; each therefore rightfully deserves its own label.

In Figure 2, three classes, labeled "distributed processing," "distributed data processing" (DDP) and "distributed data base processing," respectively, have been detailed. For each class, major characteristics have been identified, followed by data base implications and then by probable system architecture characteristics. As will be seen, these classes are very useful in approaching several current distributed processing offerings, including IBM's.

What are the major aspects of the classes? Perhaps most notable is the translation of the major characteristics of each class into a probable system architecture. In Figure 2, a "minimum" architecture is actually presented for each class; in other words, the minimum architecture of network software required to produce the respective level of data integration.

It should be noted that not only are the minimum architectures progressively more difficult for each level, but the *degree* of difference in difficulty is considerably greater from the second to the third than from the first to the second. It is at the third level, distributed data base processing, of course, where all the problems noted in the previous section actually come to bear.

The first level or class connotes a distribution of *processing*. The network architecture is sufficient for allowing the application program needed to satisfy a given transaction to execute on a different machine than the one through which the transaction is entered, but not for the application program and the data base on which it operates to be separated.

This latter sophistication is the major characteristic of the second class or level of network architecture. By allowing the data base on which an application program operates to be sup-

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DISTRIBUTED DATA BASE PROCESSING

IN DEPTH

CLASS	DISTRIBUTED PROCESSING	DISTRIBUTED DATA PROCESSING	DISTRIBUTED DATA BASE PROCESSING
MAJOR CHARACTERISTICS	The user is responsible for specifying transactions that gather needed data from multiple locations.	Application programs are responsible for specifying transactions that gather needed data from multiple locations.	The DBMS is responsible for gathering needed data from multiple locations.
	The end user must be aware of the logical distribution of data. (Physical locations are made transparent by the transaction monitor.)	The application program must be aware of the logical distribution of data. (A data base/node directory subsystem may make physical locations transparent.)	The application program is independent of the distribution of data. (The DBMS manages data distribution and integration.)
	The global data view exists in the mind of the end user.	The global data view is implicit in the functions and processes of the application system(s).	The global data view is explicitly defined in a schema, which is separate and independent from application programs.
DATA BASE IMPLICATIONS	No single transaction as presented by an end user to the network can require data to be related across machine boundaries nor can it require update constraints to be placed on the data at one node on the basis of values at another node.	No single transaction as presented by an application program (or end user) to the network can require data to be related across machine boundaries, nor can it require update constraints to be placed on the data at one node on the basis of values at another node.	Transactions presented to the DBMS are based on an integrated view. The DBMS is responsible for relating data across nodes and supporting defined update constraints.
	A "set" of data cannot cross machine boundaries.	A "set" of data cannot cross machine boundaries.	A "set" of data may cross machine boundaries.
	The management of data replication is always an end user and/or off-line task.	The management of data replication must be handled by application programs, end users and/or off-line activities.	The management of data replication falls to the DBMS.
PROBABLE IMPLICATIONS FOR A NETWORK ARCHITECTURE	An application program can only issue transactions against data bases at the local node.	An application program can issue transactions against either local or nonlocal data bases.	A transaction may be issued against a data base that is partly local and partly nonlocal.
	The "directory" component of the network specifies where application programs can be executed to satisfy the given transaction.	The "directory" component of the network specifies where the data base, against which an application program issues a given transaction, resides.	The "directory" component of a network specifies where the data for a given data base transaction actually resides.
	An application program executes on the same machine where the data base on which it operates resides.	An application program does not necessarily execute on the same machines where the data base(s) on which it operates resides.	An application program does not necessarily execute on a machine where any or all of the data base on which it operates resides.
	A DBMS at one node is unaware of DBMS at other nodes. Security and integrity of the data base(s) at its node are its sole responsibility.	A DBMS at one node is unaware of the specific data base capabilities at another node. (It may be aware of the existence of a DBMS and/or data base at another node, especially if it assumes responsibility for the transaction monitor function.) Security and integrity of the data base(s) at its node is its sole responsibility.	A DBMS component at one node is aware of DBMS components at other nodes, including content, at least as far as necessary to support any views of the overall data base needed at that node, and perhaps at others. Responsibility for data base security and integrity is shared between nodes.
	There is little incentive to integrate the directory with the DBMS since its contents are specific to application programs rather than data or data bases.	There is strong incentive to integrate the directory with the DBMS since its contents are specific to data base and data base transactions.	Integration of the directory with the DBMS is imperative since its contents are specific to the contents of data bases and their distribution.
	A transaction monitor at each node is generally responsible for routing transactions between machines and returning the results of each.	A data base/node directory subsystem, superimposed on a DBMS at a given node, is responsible for routing transactions between machines and returning the results of each.	The DBMS at each node is responsible for routing transactions between machines and returning the results of each.
	There is little immediate incentive to integrate the transaction monitor with the DBMS since application programs can only issue transactions against local data bases.	Incentives exist to integrate the transaction monitor with the DBMS since application programs may issue transactions for data bases at "foreign" nodes, thereby complicating recovery requirements.	Strong incentives exist to integrate the transaction monitor with the DBMS since application programs issue transactions for data that may cross machine boundaries and thus imply very complex recovery requirements.

Figure 2. Classification of Software Support for Data Distribution

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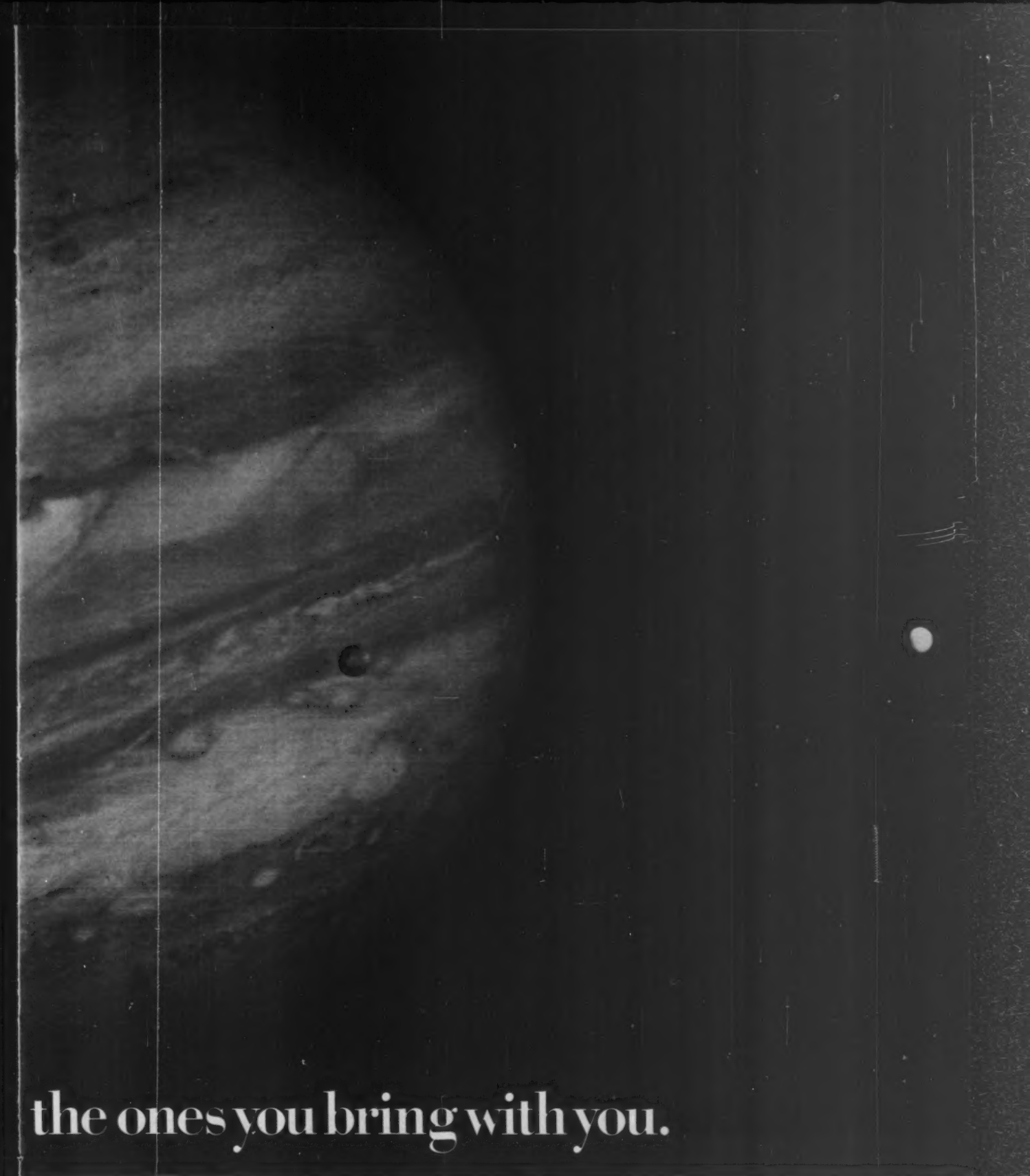

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ported on a machine distinct from that on which the program executes, the architecture goes beyond support for the distribution of processing and supports the more powerful objective of allowing data distribution. Stated another way, this means data can be distributed independently of the application processing by which it is used and supported.

The limit to this capability, of course, is that no data distribution strategy can split data bases across machine boundaries. This latter capability, certainly far more difficult than simply allowing data bases to be distributed in toto independently of application processing, is the distinguishing characteristic of the third and final level or class, distributed data base processing.

It is safe, of course, to say that no vendor's current distributed offering falls into this third class.

Classes one and two, however, are a different matter. For class one, "distributed processing," IBM's Multiple Systems Coupling (MSC) for IMS — or ISC for CICS/DL/I — is a perfect example. MSC features the routing of DC transactions between independent IMS/CPU nodes, the major feature of class one. Application programs, of course, must execute on the same machine as the IMS data base on which they operate.

Cullinane Corp.'s Multiple Computer Support (MCS) for IDMS, on the other hand, is a perfect example of class two. "Virtual" IDMS systems allow IDMS application programs to issue commands against data bases that do not reside at the virtual IDMS/CPU node. Data integration can thereby be pursued by application programs, thus removing the requirement from the end user.

Obviously, Cullinane has the edge over IBM in this area. Why would IBM yield the edge to a DBMS competitor against which it frequently goes head to head? This is an intriguing question and one to which attention will be returned later.

Infodata's IQ/Net

What about other vendors for IBM hardware? The most notable current offering is Infodata Systems, Inc.'s IQ/net, a version of Inquire for the distributed environment.

IQ/net presents problems for the classification scheme. On the one hand, it *does* allow users to issue queries that relate data across machine boundaries (a characteristic of distributed data base processing), but on the other hand, it *does not* support automatic update constraints for "sets" of data that cross machine boundaries. In fact, it does not support update constraints for sets even entirely residing on one machine.

This suggests, of course, that its interpretation of the data base problem is somewhat specialized (it favors relatively low update constraints and volumes) and that this specialization makes some departure from the classification scheme both possible and probable. To the prospective user of distributed software products, this suggests that application type will continue to play an important role in system selection, just as it has always done for DBMS proper.

Additional Observations

Before moving to a closer examination of broad industry trends in distributed processing support, several

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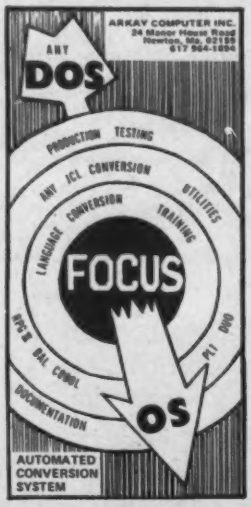

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additional observations are worth making.

In the first place, it is evident that an important feature of *any* distributed software offering, no matter what its class, is that it renders the physical location of data (whether defined in geographical or network-related terms) transparent to the system user. Requests for data are always based on a logical scheme of data distribution, which is translated apart from the user (within the network software) into physical specifications. (One can assume that the particulars of this translation are defined in system tables or "internal schemas" by a network administrator prior to the issuing of requests by users.)

In a sense, this special form of independence from the physical organization of a network is simply an expansion of the old DBMS concept of device independence. Data may now be distributed over machines as well as different storage devices.

This expanded form of device independence, which is certainly a base-level requirement for distributed offerings, is not to be confused with *logical* data organization, however, on which the classification scheme above is based. Logical organization of data, including a scheme of data distribution, is a completely distinct issue.

Should the DBMS package itself provide device independence for CPUs? (An answer to this question also involves, incidentally, the issue of DBMS support for the communications *between* machines.)

For the "distributed processing" class of network offerings, the answer is probably no. First of all, the DBMS is not involved in communications in any sense. Second, application programs *must* be able to run on the same machine as the one on which the needed data base resides.

For the "distributed data base processing" class, however, the answer is a definite yes, since the DBMS *is* involved in communications and *does* allow data base distribution independent of program execution.

Gray Area

The class in between, "distributed data processing," is the gray area. In this class, it is really not clear whether communications and CPU issues are being handled directly by the DBMS or by a special software offering more or less superimposed. Actually, the answer may simply lie with how the vendor chooses to package its distributed offering.

Even if some features of class two offerings cannot be exactly predicted, there is one very crucial aspect about them that *can* be. This aspect is the fact that under class two architectures, unlike class one, it is entirely possible to entertain a machine in the network on which *no* application programs per se actually run. In other words, one (or more) CPUs in a "distributed data processing" network may be devoid of application systems per se (they can all be running on other machines) and devoted entirely to the task of data base management. Call this a data base machine, if you like, but it is clearly a very important feature of class two architectures. (Now you may have a clue why IBM's architecture is class one.)

It is relatively easy to predict that most distributed offerings in the foreseeable future will be of the class one or two variety, rather than of class three.

In data base terms, the irony of this development is that to some extent, both former classes (though to different degrees) represent a retreat from the automatic data integration features offered by DBMS today on a single CPU. Thus, as previously mentioned, the plunge into distributed processing for some organizations is going to mean adverse implications for data resource management in the larger sense.

This is an undeniable, and often overlooked, fact about the distributed processing bandwagon.

Still, some caution must be exercised in taking this criticism too far, for the following reasons:

- With distributed processing, the data resource in question is actually much larger than before and not simply a distribution of the old data base applications.
- Integration will remain an important advantage at each individual data base node.
- Nonintegration will always imply data redundancy in a distributed envi-

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ronment (as it almost always does in a centralized environment) since in a distributed environment, for example, data *types* may be redundant across nodes, but not necessarily the associated data *values* themselves.

The user organization will want to take a long, hard look at its future data distribution schemes in order to fully identify the sacrifices it may (or may not) be making in the area of data integration in its data distribution schemes.

Within the IBM-compatible DBMS vendor community, the introduction of the 4300 is being widely heralded as a major milestone in achieving DDP. Vendors consistently point toward the 4300 as evidence of the following facts:

- The price/performance ratio of computer power has now reached the threshold where distributed processing can become a practical reality.
- IBM itself is moving toward the distributed market, essentially opening that market (as only IBM can really do) "by announcement."

A more subtle point is this: Since the 4300 is completely compatible with larger IBM mainframes, the 4300 path to distributed processing no longer means (as it always has with the mini and mid-range machines of other vendors) that application software systems must be reinstalled for the distributed environment.

To a corporation, this means significant protection for investment in existing programming. To the DP department, it means the problem of non-compatible data formats and protocols need no longer be a concern. Significantly, the 4300 is of sufficient size so that mainframe software can be executed without substantial pruning.

There are, of course, several ironies in the DBMS vendors' acclaim of the 4300 for DDP.

In the first place, all the independent DBMS vendors have very large IBM software systems themselves. It would therefore not be too difficult to predict that they would seize upon an IBM hardware event to herald the advent of DDP. (This point, surely, is not lost on IBM, which in certain ways, oddly, has become almost protective of the IBM software industry.)

A second irony is that for the software vendors, DDP means more machines and more machines mean more software. Multiply the distributed 4300 market times the cost of even discounted DBMS package price tags and you will get some glimmer of DDP economics as the vendors themselves see it.

A final irony is that both of the DBMS vendors previously mentioned, Cullinane and Infodata, had already undertaken significant development of a DDP offering *before* IBM's 4300 announcement, even though they both markedly emphasize the 4300 in their product perspectives. In essence, they have simply seized upon a hardware event to validate and promote their own product designs.

The same type of action would undoubtedly occur if IBM suddenly announced an associative memory or equivalent. ("Suddenly," of course, is not really accurate since IBM development is almost always divined by industry observers before it is actually announced. The only real surprise is usually just the actual date.) Soon after such an announcement there undoubtedly would be several DBMS vendors quickly announcing relational support.

The point of this comparison is that the DP public has largely become conditioned to the idea that significant software innovation is tied directly to hardware advances. In a sense, of course, this is true. But in another sense, software vendors are going to try to turn such advances to their immediate advantage whenever and wherever they can.

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IN DEPTH

distributed DBMS offerings, two schools of thought seem to be emerging. The heart of the distinction between them lies essentially with a decision concerning how the growth of the data resource in the corporation will be predicated.

Accrual. In this view, capabilities for building data bases are decentralized and only loosely controlled by any central authority. Each potential node of a future network is charged with building its own local data bases to be made available, by some distributed system software, later on to other nodes in the network, possibly including a central managerial authority. The scope and purpose of local data bases and plans for their subsequently expanded availability are not predetermined in any substantial detail.

The overall data resource gradually crystallizes in form and scope as more and more pieces become available from different locales. In sum, the global data base view grows by accrual rather than by explicit design.

Design. In this second view, capabilities for building data base are highly centralized and tightly controlled by the authors of the network. Each network node is conceived from the very beginning as a functional unit of the overall network plan, having well-defined scope and purpose.

The availability of information components of the data resource is planned well before the actual fact of network implementation. Often, a hierarchical pattern of nodes is established, with data being summarized and forwarded upward toward a central managerial authority. The overall data resource grows in a methodical and well-coordinated fashion. The global data base view is created by purposeful design, rather than ad hoc accrual.

A number of observations can be made about these two schools.

In the first place, the latter school merely represents the latest expression of traditional mainline DP thinking, whereas the former, in certain respects, clearly shows the rampant anti-DP sentiment evident in some quarters of the distributed movement.

Why is this so? Clearly, the accrual school aims toward giving local users a greater say in the patterns of DP development in the corporation. Whereas the design school can be viewed largely as a DP solution to communication costs (and perhaps fairly, to giving greater computing responsiveness to local conditions), the accrual school is squarely aimed at taking control away from unresponsive and inertial central DP groups (this is its view anyway) and giving it to local users who, as the doctrine goes, have greater stake in effective systems.

To DP hard-liners, this organizational renovation of traditional computing patterns can be viewed as nothing short of radical. To those more familiar with the aims and successes of end-user DBMS packages, this seems much less the case.

Naturally there are trade-offs. The accrual method emphasizes flexibility and local tailoring, plus use of local knowledge, motivations and talents (one might add political frustrations). Data integration and overall performance may be sacrificed in the process.

The design method emphasizes more or less the reverse: tighter controls are placed on data integration and integrity *across* the data resource, but flexibility and local usage options may be sacrificed. Certainly, DP staff strengths and motivations are exploited more than their end-user equivalents.

Important to some corporations may be the fact that the design method requires homogeneity of machines and software across the network whereas the accrual method risks hardware and software compatibility to policy and standards. These latter may not be effective in an environment of decentralized initiative. The design method also favors strong central processing capability, whereas its counterpart does not.

Obviously, these criteria can be used to select between strategies only where organizational structures and application types are well considered. Divergent functions among organizational units and weak central management favor accrual, whereas functional conformity and strong central management favor design. A situation in which data is seldom updated, where relationships between different types are relatively minor and where discov-

(Continued on In Depth/14)

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IN DEPTH

(Continued from In Depth/13)

ery is more important than accuracy favors accrual. The reverse of these characteristics favors design.

Are DBMS vendors responsive to the divergent needs the two schools represent? The answer is a definite yes, even though each individual vendor is likely to align itself only with one or the other. Cullinane's approach with IDMS, for example, falls clearly into the design school; Infodata's IQ/net is an excellent example of accrual.

It is no accident, incidentally, that these two vendors represent, respectively, the traditional "physical linkage" and "data inversion" DBMS classes. The former has always emphasized data integration, well-defined global views and DP orientation, in contrast to the highlighting of user friendliness, local views and data base growth in steps by the latter.

Whether the vendor sells hardware or software for multiple-machine families is not really an important factor. Cincom Systems, Inc. and its Total, for example, are likely to fall into the design school (TIS is a good indication), whereas Intel Corp. (formerly MRI) and System 2000 are almost certain to go to the accrual camp.

What about IBM? It certainly favors the design school, not only because IMS itself tends in that direction, but because the design school strongly favors homogeneity in hardware and software, managed by a central authority. That characteristic can be translated directly into more machine sales aimed at an authority (the DP department) where IBM's leverage is already good. The other school, accrual, is perilous ground for IBM because it represents the possibility of users doing "their own thing" with computer methods (and perhaps being seduced to the competition in the process).

Back-End Processor Vs. Data Base Machine

No look at DDP is really complete without a look at the hardware that is likely for data base and network requirements in the coming years. The final section of this article is devoted to certain questions in this all-important area.

First of all, when is a machine dedicated to the data base function really a back-end processor and when is it really a data base machine? Does the distinction really matter?

The answer to the latter question is yes, because the two terms refer to two distinct technological trends.

The first trend has to do with adding processing capacity to a mainframe and/or improving data base access performance. Given a single processing resource (or at least one that looks that way to application designers), the back-end processor seeks to improve cost/performance characteristics by distributing processing intelligence across more than one processing unit.

The simplest case is that of interfacing two more or less stand-alone units — a mainframe and a mini — to add capacity to the single computing resource. This is the traditional back-end concept and one which has largely proven disappointing in several prototype efforts.

But the back-end concept can be made much more subtle. A group of 25 micros, for example, could additively result in a very powerful *and* cheap processing resource — *if their power could be effectively harnessed.* If some of those micros were devoted purely to data management functions, suddenly the back-end idea reemerges, albeit in much more elaborate guise. A configuration of dedicated back-end microprocessors becomes a convenient way of conceptualizing what is really a scheme of distributed intelligence in

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IN DEPTH

the computing resource.

Twenty-five micros, incidentally, is an arbitrary number; some people actually talk about hundreds or thousands, or even a micro on every *track* of every disk. Even implementation in that quantity, however, is still to be viewed as part of a single computer resource. It is essentially still a machine implementation scheme to improve the back-end cost/performance of a generalized machine.

Second Trend

The second technological trend has to do with putting computer resource units into networks. Here the influences are considerably different from those leading to distributed *machine* intelligence to improve capacity.

Networks can be said to arise for two essential reasons: to reduce communication costs and to improve computing responsiveness to local conditions and initiatives.

Still, data in a network must be shared. Undoubtedly, the data at some nodes will be considered even more highly sharable than the data at other nodes. This in itself begins to predict some pressure toward machine specialization at nodes in the network.

Such specialization is further encouraged by the fact that limitations in DBMS software and its engineering, as previously discussed, highly favor both nonreplicated data and data bases that do not cross machine boundaries.

These limitations suggest that a given data base is likely to end up on a single computing resource where any of the following criteria hold true:

- Data cannot be easily partitioned by usage across nodes.
- Moderate to heavy updating must be entertained.
- Update and integrity constraints (data integration) are rigorous.

It is not unlikely that any resultant machine specialization at a network processing node would in fact entertain many of the same techniques of innovation also likely for a back-end configuration. The essential difference, however, is the fact that the data base machine is tied to many hosts rather than to only one, such that its visibility as a stand-alone unit is much greater.

This is the crucial distinction. Trends strongly suggest that back-end development will not actually be separable from the computing resource package (or box), whereas a data base computer, if one were to emerge, would almost have to be. In other words, only the mainframe vendor could sell you any back-end improvements, whereas *any* vendor could sell you a data base machine for your network.

One can legitimately wonder, therefore, just how keen IBM would really be about the concept of data base network node machines. It would not be surprising to find IBM *against* specialization of function in a network.

Now reconsider MSC. Was IBM's decision to make MSC a class one, rather than class two, product consciously based on this antispecialization bias? One would have to be IBM to know. One *would* have to note, however, that it is not IBM's usual practice to give a significant software edge to its competitors in a major qualitative area.

Predictions: DDP, DBMS

It now seems certain that the back-end processor as originally conceived in the 1970s — that is, a mainframe coupled to a stand-alone mini — will not appear in the marketplace. The reasons, which are technical and economic, include the following:

- Communications overhead in prototype back-end systems has been found largely to cancel predicted memory savings and capacity enhancement through processing overlap.
- Mainframe overloading can be better solved by larger mainframes or attached processors, especially as the cost of hardware relative to performance continues to decline. (In other words, adding capacity to a mainframe is best achieved by means other than a back end.)
- For market reasons, IBM is not interested in any scheme that results in the distribution of processing intelligence or specialization of function into visible, stand-alone processing units. Bigger, generalized machines are its forte, and the traditional back-end concept exposes it to competition in a particularly dangerous area.

This assessment does not mean, how-

(Continued on In Depth/16)

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IN DEPTH

(Continued from In Depth/15)

ever, that certain back-end objectives have been forgotten; indeed, as discussed above, many are likely to be resurrected as more and more networks appear, many of which will inevitably favor the locating of data bases on single processing resources.

Thus specialization of processor function, in the new guise of data base network node machines, is inevitable.

Still, hardware specialization on any large scale is unlikely in the near future for the following reasons:

- DBMS software methodologies are not yet so error-free, or so conceptually advanced, that they could be safely placed into hardware.
- Hardware implementation of DBMS software would require considerable memory, of still expensive types. The economics of such implementation cannot yet be balanced in favor of the hardware route.
- Generalized machines have real advantages for keeping pace with rapidly evolving storage technology.
- For IBM to take such action unilaterally, an inevitable result of the implied altering of existing hardware/-software interfaces would be a traumatic impact on the DP industry — an outcome that for antitrust reasons IBM could hardly welcome.
- For all other vendors, no one would want to go first and thus bear the brunt of IBM defensive reactions.

Nevertheless, all bets are off as the following events occur in the 1980s:

- Communication costs decline and speeds improve.
- More and more corporations migrate to DDP in one form or another.
- Corporations continue to migrate to DBMS packages.
- Memory technologies advance.
- Advances in distributed intelligence using micros as an implementation method for computing resource units possibly reverse economics that now favor generalized machines.
- Some vendor other than IBM, using this or some other technology, produces a data base machine or a relational associative processor so convincingly powerful that IBM's market position is threatened.
- Prototype DBMS of class 3 are found ponderously difficult to implement and support.

Ironically, all these factors may make the emergence of a data base machine not only inevitable, but more likely than evolution of DBMS to class 3.

What will IBM do in the meatime? Most likely, it will focus on schemes for nonvisible distributed intelligence and performance improvements through microcoding.

Vsam, it is argued, is a prime candidate in this area, because (a) it is available to all applications, not just to data base, (b) it is more reliable than a DBMS, (c) it engenders no major DP market impact and (d) it can be "distributed" without exposure to competitive, stand-alone equivalents.

IBM is not going to expose itself by specialization, including data base machines, until forced to do so. Meantime, because MSC is a class one offering, IMS users will be asked to bite the bullet on the most basic of all data base themes, that of data integration.

On April 28th, our Special Report on Source Data Entry will give you the input you need on OCR, key-to-disk, and the problems of data entry.

Edited by Jay Woodruff and Tom Henkel, the first half of this Special Report is a consumer guide to OCR and key-to-disk systems. Included will be lists of popular vendors in these data entry fields and a comparison of the packages they offer.

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Ronald G. Ross is editor of the Data Base Newsletter, a bimonthly publication of Performance Development Corp., a data base consulting firm in Princeton, N.J.

Ross is the author of a number of other professional publications, including Data Base Systems: Design, Implementation and Management *(Amacom, 1978), and* IMS Concepts *(PDC, 1979).*

Ross holds a B.A. degree from Rice University and an M.S. degree from the Illinois Institute of Technology.

Offers Program Development

Office Workstation Combines WP, DP

PALO ALTO, Calif. — Artel Corp. has unveiled an office automation system, based on a 16-bit microcomputer, that is said to combine word processing (WP) and data processing capabilities.

In its basic configuration, the Series 1000 workstation includes a console with a 15-inch CRT; a detached keyboard; two single-sided, double-density, 8-in. floppy disk drives housed in a separate cabinet; and a Qume Corp. printer. In addition to the CRT, the unit's console houses the MPU, a number of I/O and communications controllers and 64K bytes of memory, a spokesman noted.

The system can be expanded to include up to 832K bytes of random-access memory; one or two fixed-disk modules for a total of 250M bytes of fixed-disk storage; and up to eight flexible-disk drives, for a total of 4M bytes of flexible-disk storage, the spokesman continued.

To control the disk storage system, printers and other peripherals, the system uses multiple microprocessors dedicated to specific functions. By using this design, certain operations can take place without tying up the MPU, he added.

The unit's software includes all the standard WP functions, plus a number of filing programs for basic DP tasks. In addition to its end-user features, the Series 1000 is also designed for program development, the spokesman pointed out. The operating system includes a Pascal compiler, B-tree file system, text editor and utilities for file manipulation.

The Series 1000 Workstation

Finally, the computer is designed around Intel Corp's Multibus, so peripherals manufactured by a number of companies can be used with the system.

The system costs about $14,500 in its basic version from the company at 3941 E. Bayshore, Palo Alto, Calif. 94303.

Lexitron Injects DP Power Into VT Series WP Systems

CHATSWORTH, Calif. — While the majority of small business computer makers are currently scrambling to integrate word processing (WP) functions into their machines, Lexitron Corp. has taken the bull by the tail and injected a number of DP features into its two top-of-the-line WP systems.

Aimed at approximately 5,000 present and future users of the firm's VT 1202 and 1303 systems, the records management system (RMS) is basically a series of software programs that allow operators to process, manipulate and maintain employee, inventory or accounting files. The only hardware change required is a keyboard overlay that changes the labels of some of the keys to specify DP activities.

Designed to compete with the DP capabilities offered by machines such as Wang Laboratories, Inc.'s VS series of medium-scale business systems, Lexitron's RMS-enhanced computers are targeted for the user who does not want to get too bogged down by the technicalities of computing. For instance, the software is modular in design, user-programmable and defines operations in a menu-like fashion.

Benchmark Tests

While the 1202 and 1303 do not come close to offering the memory and peripherals of the Wang VS systems, a Lexitron spokesman noted that the latter machine with RMS competed in a benchmark with several stand-alone small business systems and proved to function about four times faster than its computer contemporaries.

However, the spokesman would not reveal any figures of the benchmark or tell exactly which systems participated in the tests.

Moreover, in regard to the systems' hardware limitations, the company is presently looking at such things as fixed hard disk files and recently introduced communications options that allow Lexitron systems to interact with similar systems.

The RMS-enhanced WP systems can support records up to 512 char. long and permit the creation of up to 256 fields in each record. Users can reportedly develop employee files or inventory files using English-language commands and user-defined masks. To save time and memory space, the system also allows the user to define up to 99 translation tables per file, using two-digit codes for such things as job categories and parts identification.

Support Services

Since all of the systems' software and file structures are user-definable, Lexitron offers a number of services to support the user and help set up an initial records base. These services include a support group of application analysts that come to the user's site and develop file structures; a training class sponsored by Raytheon Co., Lexitron's parent firm; and a soon-to-be-started problem hotline.

Although the RMS programs will function, to a limited degree, on the firm's single-diskette 1202 text processor, it is designed to operate at its full records management capability on the double-diskette 1303. With a 55 char./min printer, the 1202 and 1303 cost about $13,850 and $15,500, respectively. The RMS software can be purchased for a one-time fee of $2,000 and a monthly maintenance fee of $25, or leased for $150/mo including maintenance.

Additional information on the system, which will be available this June, can be obtained from the company at 9600 DeSoto Ave., Chatsworth, Calif. 91311.

Tape System for DEC Minis Records in Three Formats

WOBURN, Mass. — A tridensity magnetic tape storage system for Digital Equipment Corp. PDP-11 and VAX-11/780 minicomputers that enables users to record in three different tape formats and store more than 150M bytes on a 2,400-ft reel has been introduced by Aviv Corp.

Billed as the first tape system of its kind for PDP-11 and VAX Unibus systems, the Aviv 806 is said to allow a data transfer rate of 780K bytes, reportedly four times faster than the fastest conventional 1,600 bit/in. tape system.

The system records in 6,250 group code, 1,600 phase-encoded and 800 NRZI bit/in formats and incorporates a Telex Computer Products, Inc. 75- to 125 in./sec tape drive. The 806 system also includes a single-slot controller that can handle up to eight tape drives. The controller also has a 4K first-in first-out buffer and on-the-fly, two-track error-correction facilities, a spokesman noted.

Tapes recorded on the Aviv system are said to be fully interchangeable with those recorded on IBM-compatible systems, and the unit's software is transparent to DEC operating systems. The 806 is the second 6,250 bit/in. group code recording format tape system manufactured by the company for DEC machines.

Prices for the tape system start at $30,200 and delivery is about 120 days. OEM discounts are also available, Aviv said from 6 Cummings Park, Woburn, Mass. 01801

Small Business System Provides WP, DP

LOS ANGELES — E. & U. Engel Consulting has announced a micro-computer-based business system that performs both DP and word processing (WP) functions and can include up to 256K bytes of random-access memory (RAM).

The Angel-1 System

The Angel-1 consists of an S-100 bus processor, a Z-80 MPU, an 80-char. CRT and a Qume Corp. daisy-wheel printer. The system also includes two single-sided single-density floppy disk drives.

To accommodate expansion, the machine can handle up to 256K bytes of memory, four double-sided double-density floppy disk drives and fixed or cartridge disk drives and multiple CRT stations.

The Angel-1 costs $7,995 housed in a formica desk enclosure, or $7,795 in a desktop version. Delivery is presently 30 days, the spokesman said from 1719 S. Carmelina Ave., Los Angeles, Calif. 90025.

Diva Doubles Mass Storage For DEC, Perkin-Elmer Units

EATONTOWN, N.J. — Diva, Inc. introduced two 600M-byte disk drives that double the mass storage capability of its Computroller V disk systems for Digital Equipment Corp. and Perkin-Elmer Corp. minicomputers.

The enhanced Computroller V systems are available in fixed or removable media models for DEC PDP-11 and PDP-11/70 and Perkin-Elmer 32-bit machines.

The Computroller V controls up to eight drives of different sizes and transfer rates. With the 600M-byte units, it can handle up to 5.2G bytes of data at transfer rates up to 1209K byte/sec, a spokesman said.

Prices for the 600M-byte drives have not been established yet, the manufacturer said. Diva is at 607 Industrial Way West, Eatontown, N.J. 07724.

Tape Coupler Links PDP-11 To Eight Drives

GARDEN GROVE, Calif. — An intelligent magnetic tape coupler that plugs into a single Digital Equipment Corp. PDP-11 controller slot to interface up to eight dual-density tape drives has been announced by Distributed Logic Corp. (Dilog).

The DU-130 is compatible with DEC's TM-11, RT-11, RSX-11, RSTS, IAS and Mumps software. It uses up to 60% less power than multiple-board embedded controllers, a spokesman claimed.

The microprocessor-based coupler is contained on one quad printed circuit module; on-board LED indicators provide a display of the unit's status.

In operation, the device couples two formatted tape drives with three slave units each, for a total of eight tape drives. The coupler handles 9-track 800/1,600 bit/in. standard drives at speeds from 12.5- to 125 in/sec.

It also features a first-in/first-out buffer for direct memory access latency, automatic self-test and software- or switch-selectable density control, the spokesman noted.

The DU-130 costs $1,695 from Dilog at 12800-G Garden Grove Blvd., Garden Grove, Calif. 92643.

Deal Offered To Schools

SANTA CLARA, Calif. — Commodore Business Machines, Inc. has announced that from now through August it will donate a free minicomputer system for every two purchased by any qualified school district or educational institution.

Under the terms of the promotion, the first two micros must be purchased at list price from a Commodore dealer. The offer applies to the firm's complete line of Pet and CBM models, which are available in 8K-, 16K- and 32K-byte memory capacities and range in price from $795 to $1,295.

All three computers must have the same amount of memory to qualify.

Further information on the promotion can be obtained from Glenn Baylor at Commodore, 3330 Scott Blvd., Santa Clara, Calif. 95051.

Zilog Adds Z8-Based MPU With Basic Interpreter

CUPERTINO, Calif. — Zilog, Inc. has unveiled a single-board Z8-based microcomputer system that features the firm's Basic/Debug interpreter and can accommodate up to 8K bytes of random-access, read-only or erasable read-only memory in any combination.

The Z8-SBC, designed for time-dependent DP and data acquisition applications, incorporates two counter timers, five 8-bit parallel I/O ports and a programmable asynchronous serial channel that supports the RS-422 or RS-423 interface standards, a spokesman said. The device also has 124 general-purpose registers and three levels of interrupts.

The Basic/Debug interpreter is masked onto the unit's 2K internal read-only memory. Basically a subset of the original Dartmouth Basic, the interpreter has reportedly been simplified and modified to meet the needs of board-level applications.

The Z8-SBC is said to be the first of a family of compatible microcomputer boards the California-based company will offer. The current offering is priced at $695 ($795 with an additional 4K bytes of random-access memory) and will be available in July. Zilog is located at 10460 Bubb Road, Cupertino, Calif. 95014.

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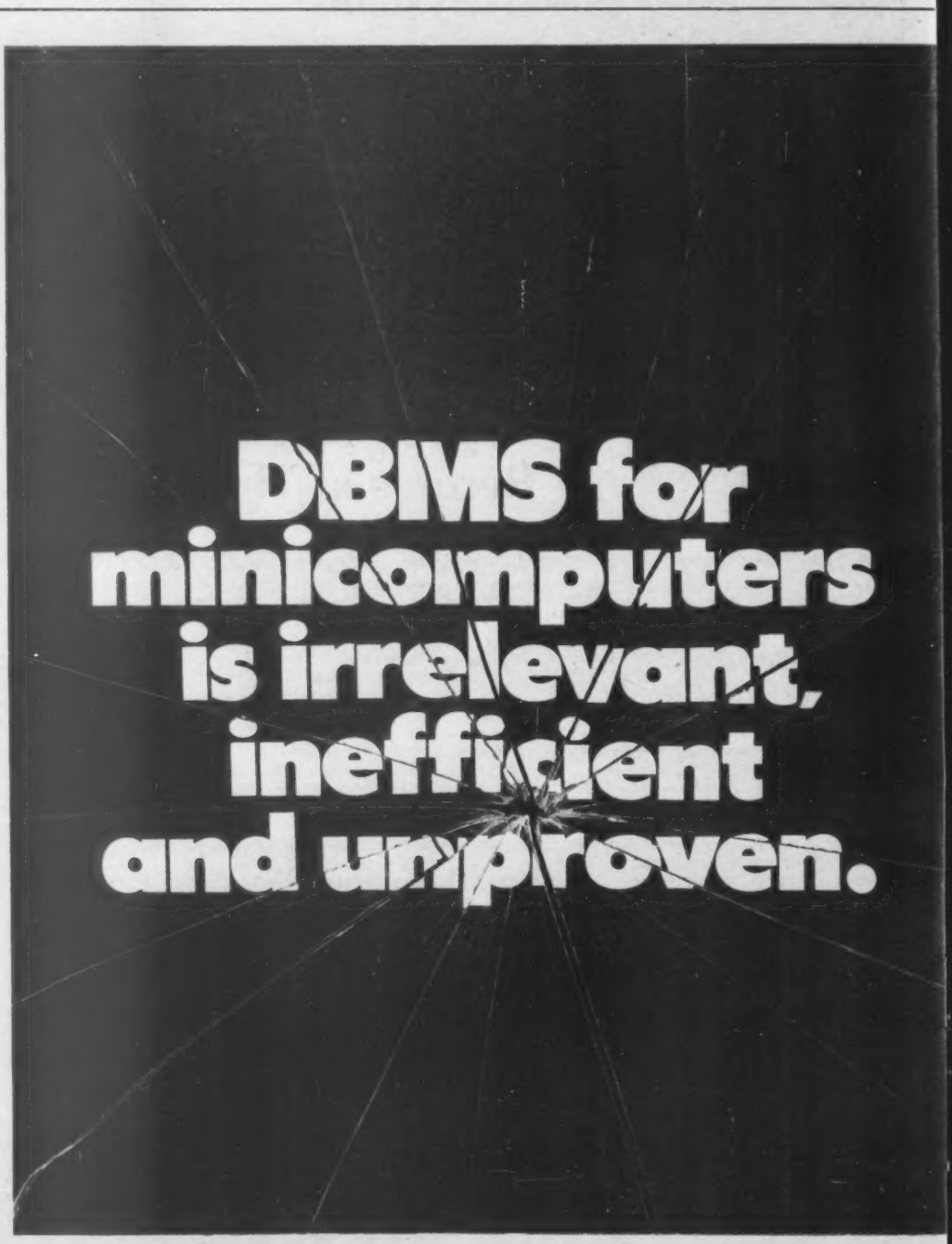

Accounting Department Automates

Builder's Business System Levels Paperwork

Special to CW

IRVINE, Calif. — An unusual characteristic of the construction industry is that enormous amounts of money and reams of paperwork are usually handled by small administrative staffs. Bogged down by management and bookkeeping chores, most companies find that a small business computer can be an enormous help.

At Saffell and McAdam, Inc., a commercial and industrial builder based here and operating in four counties, executives turned to a Basic Four Corp. System 410 to automate its accounting operations. Switched on-line in January, the system uses Basic Four's Comprehensive Business System (CBS III) accounting software and operates in the Business Basic programming language.

Presently, the system is used for accounts receivable and payable, costing, payroll, financial statements, cash flow and job analysis, according to Shirley Cornyn, the company's controller.

"A particular advantage we found in the system was its ease of use...which makes operation intelligible to most office people within a relatively short time and with minimal training," Cornyn said. "DP professionals aren't needed for efficient operation of the system, which permitted it to fit quickly and easily into our three-person operation."

Saffell and McAdam's System 410 consists of a CPU with 48K-bytes of memory, two CRT terminals, 28M bytes of disk storage and a 150 line/-min printer.

The accounting package is a modular system consisting of five basic programs: construction job cost, with subcontractor ledger; payroll, labor distribution and reporting; accounts payable interfaced with job cost and general ledger for subcontract retention; general ledger, with balance sheet and financial reporting generator; and accounts receivable with progress billings.

Besides the basic accounting applications, the firm has programmed the System 410 to generate various kinds of projections on different building projects and provide the company with job position reports.

Shirley Cornyn (center) reviews report with Betty Day, accounting manager, and Lloyd Ross, president of Saffell and McAdams.

No Staff Increases

"Our accounting staff has been able to learn the new computer tasks on the job, as each program progressed. Our construction volume continues to increase, but despite this and the increasing demands it puts on the accounting department, we are able to handle the increased load easily with no increase in our accounting staff," Cornyn noted.

Unlike many construction companies that rely almost exclusively on subcontractors and jobbers, Saffell and McAdam does its own concrete and framing, for which some 125 people are employed. This in turn results in heavy payables and requires an intricate cost-coding system in order to maintain control.

The 30-year-old firm previously used accounting machines — installed in 1972 — to handle bookkeeping, but these proved inadequate as the amount of paperwork and need for reports increased. Also, the accounting machines could not provide such things as up-to-the-minute job projections or position reports, Cornyn recalled.

Two years ago the company made the decision to pursue a computerized accounting route. After a three-month screening process, Saffell and McAdam chose the Basic Four system.

"The criteria on which we made our selection included hardware, software, support, price and service," Cornyn continued. Basic Four, a Management Assistance Inc. (MAI) company, satisfied these criteria with software support by Interactive Computer Systems of Costa Mesa, Calif. and service available through Sorbus, Inc., Basic Four's sister MAI subsidiary.

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The DBMS that shatters the myths.

For companies building minicomputer based systems, there's a fresh opportunity to design and implement integrated information systems right from the start.

But while the benefits of DBMS are well known, myths about its relevance on minicomputers may be leading you toward another kind of solution that's more cumbersome—and more costly. A choice that could eventually paint you into a corner.

So the first step in building your minicomputer based system is to tear down the myths about DBMS. Myths that have been shattered by Cincom's Minicomputer TOTAL.

Myth #1. DBMS is for mainframes, not minicomputers.

While DBMS did grow up with mainframes, it is rapidly becoming the data management standard for today's commercial minicomputer applications. That's because the complexity of the data management problem bears little relationship to the size of the processor. And for your sophisticated applications, only Minicomputer TOTAL provides the power and flexibility you need for today—and as you grow.

Myth #2. Data base management systems for minicomputers require too much overhead.

This may be true of other DBMS's, but not TOTAL. Minicomputer TOTAL has the lowest overhead requirements of any DBMS in the industry, making it the most efficient system available. Its powerful design minimizes I/O, memory requirements, and disk space, which gives you the benefits of a DBMS—while reducing your hardware costs.

Myth #3. There is no proven Minicomputer DBMS.

Operating successfully at more than 1200 minicomputer installations worldwide, Minicomputer TOTAL has been proven in use. Introduced in 1977, it has been refined and perfected to become the most widely used minicomputer data base management system available.

The TOTAL approach.

Minicomputer TOTAL's blend of power, performance, and efficiency is what makes TOTAL so unique.

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TOTAL's flexibility and power also means it is easier to learn and use than any other Minicomputer DBMS. Data base design and application programming can be mastered after only two days of technical training. The result: faster implementation and higher productivity.

In addition, TOTAL is the most portable minicomputer DBMS. Only TOTAL offers horizontal data base portability across 18 different minicomputers while providing vertical compatibility to Series 80 TOTAL in the mainframe environment. This unique benefit allows you to (1) develop applications centrally and distribute them to users with different target minicomputers, and (2) lay a solid foundation for distributed data base.

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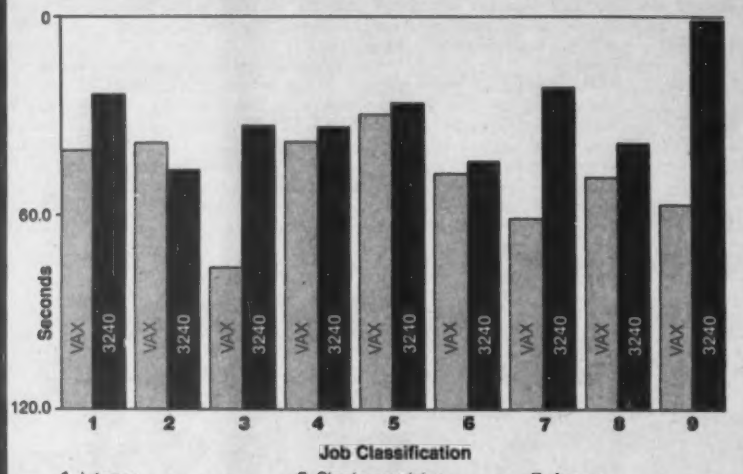
The benchmarks prove it...

1. Performance Measurements

Benchmark Name	VAX 11/780 CPU time	Perkin-Elmer 3240 CPU time	Performance Ratio*
PMS0154	1.140	0.907	1.26
PMS0254	4.710	4.485	1.05
PMS0354	9.160	8.990	1.02
PMS0454	43.610	43.451	1.00
PMS0554	86.420	86.123	1.00
PMS0664	1.610	1.350	1.19
PMS0764	7.040	6.679	1.05
PMS0864	13.730	13.370	1.03
PMS0964	66.830	66.068	1.01
PMS1064	132.920	129.727	1.02
PMS1124	1.520	1.306	1.16
PMS1234	2.470	2.424	1.02
PMS1324	1.310	1.618	0.81
PMS1407	251.560	37.327	6.74
PMS1507	50.260	57.657	0.87
PMS1674	22.440	23.005	0.98
PMS1724	52.550	53.133	0.99
PMS1807	50.180	34.766	1.44
PMS1907	32.020	34.679	0.92
PMS2007	17.720	20.264	0.87
PMS2107	13.450	20.242	0.66
PMS2202	33.311	26.352	1.26
PMS2324	121.610	137.997	0.88
PMS2402	0.940	0.539	1.74
PMS2502	0.720	0.562	1.28
PMS2624	122.920	227.689	0.54
PMS2708	4.850	0.961	5.05
PMS2809	103.770	0.006	17295.00
PMS2934	0.660	0.414	1.59
PMS3009	0.230	0.006	38.33
PMS3103	0.610	0.398	1.53
PMS3202	4.740	3.923	1.21
PMS3307	2.470	1.959	1.26
PMS3407	39.190	7.774	5.04
PMS3507	5.580	2.587	2.16
PMS3607	156.540	20.077	7.80
PMS3701	4.480	1.621	2.76
PMS3802	4.060	2.874	1.41
PMS3903	6.050	3.864	1.57
PMS4002	9.330	5.505	1.69
PMS4102	76.290	77.764	0.98
PMS4202	118.490	125.039	0.95
PMS4301	110.650	75.569	1.46
PMS4403	1.990	0.739	2.69
PMS4584	219.990	189.081	1.16
PMS4603	18.640	16.939	1.10
PMS4701	0.350	0.077	4.55
PMS4802	0.830	0.880	0.94
PMS4934	0.340	0.050	6.80
PMS5008	0.430	0.168	2.56
PMS5108	98.950	55.419	1.79
PMS5208	0.900	0.917	0.98
PMS5308	0.330	0.029	11.38
PMS5408	2.080	1.697	1.23
PMS5502	1.130	2.180	0.52
PMS5602	207.140	198.685	1.04
PMS5703	585.170	254.545	2.30
PMS5824	18.740	18.194	1.03

*Performance Ratio = $\frac{\text{VAX 11/780 CPU time}}{\text{Perkin-Elmer 3240 CPU time}}$

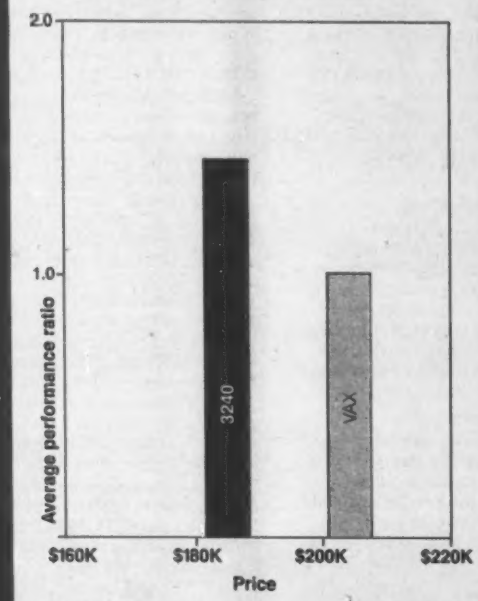
2. Perkin-Elmer 3240 vs. VAX* Average Time by Job Classification



1. Integer
2. Single-precision
3. Double-precision
4. Math functions
5. Single-precision whetstone timings
6. Double-precision whetstone timings
7. Arrays
8. Job mix
9. Compiler technology

*VAX is a trademark of Digital Equipment Corporation.

3. Proven Price/Performance



The configurations tested were 2 MB of memory, 67 MB disc, 75 ips tape, Floating Point Processor, CRT terminal, battery backup, and system software. The 3240 had a Writeable Control Store and Fortran Enhancement Package, while the VAX 11/780 had a Floating Point Accelerator.

The Perkin-Elmer 3240 is Faster than VAX.

Our 32-bit Model 3240 performed 44 out of 58 benchmark tasks faster than the more expensive VAX 11/780.

We matched our Model 3240 against the VAX 11/780 in 58 customer supplied benchmarks, comprising 697 million FORTRAN statements.

In 44 of the benchmarks, the 3240 performed *faster* than VAX.

Overall, the 3240 delivered an average 1.4 times higher performance.

Yet the 3240 configuration costs approximately $20,000 less than its corresponding VAX configuration.

All 58 FORTRAN benchmarks listed in Table 1 were submitted by our customers and prospects reflecting their application needs. Applications that deal with the same kind of problems you face every day.

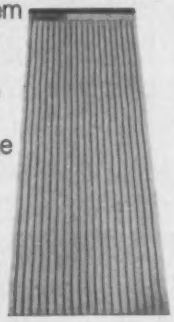
All benchmarks were run on-site at various locations across the country. And all were run by vendor-trained operators..

In Table 2, we organized the benchmark results into nine common types of job classification, so you can see at a glance how the 3240 stacks up vs. VAX 11/780. (The ninth classification demonstrates the superiority of Perkin-Elmer's system software, in this case globally optimizing FORTRAN VII.)

As shown in Table 3, the story is simple and uncomplicated. The Perkin-Elmer 3240 outperforms VAX 11/780. And it costs less.

The 3240 is faster than VAX in another important way—we can deliver it faster.

We'd be happy to send you a sub-set of those benchmarks which are non-proprietary or have been released with permission, so you can run them yourself. We'll also send you hardware and software documentation.



Before you make a decision on any supermini system, get all the facts on the new 3240 from Perkin-Elmer.

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PERKIN-ELMER

Disk Controller Ready for TI-990; Provides Built-In Error Correction

SUNNYVALE, Calif. — A single-board, high-density disk drive controller that is plug-compatible with Texas Instruments, Inc. TI-990 microcomputers has been introduced by Microcomputer Systems Corp. (MSC).

The MSC-1990 provides control for up to three storage module disk drives (SMD) and utilizes a microprocessor to be functionally compatible with the existing TI operating system. In fact, the controller is said to be completely software-transparent to the TI computer and is a plug-compatible alternative to the firm's Trident disk drive.

In order to achieve transparency, the MSC-1990 maps a number of logical units onto one, two or three of the SMD-type disk drives. The controller buffers the user data in two 256-word buffers to not only match the data transfer rates of the disk drives, but also the transfer requirements of the host TI-990 system, a spokesman said.

The controller implements automatic head and cylinder switching and supports partial-sector data transfers, he noted.

ECC, Retry Capabilities

To help reduce the impact of disk errors, the controller boasts a hardware error correction code (ECC) and automatic retry capabilities. With ECC, single-burst data errors are detected and corrected within the 1990's buffer before data is transferred to the microcomputer, the spokesman claimed.

The automatic retry feature is used when a seek error is encountered and includes recalibrating the drive and repeating the last operation.

In addition, the controller incorporates firmware-implemented techniques to continually monitor system operation, the spokesman continued. In the event of failure, the status of the disk and controller is reported to the host computer.

If the failure prevents the controller from reporting the status directly to the MPU, an LED display signifies the type of failure encountered.

Built-in microdiagnostics reportedly allow the 1990 to be self-tested, including all I/O functions.

The controller's overall test features are said to minimize the time required to find a defective subsystem. When used in conjunction with the TI-990's host-resident diagnostics, it decreases the mean time to repair, the spokesman claimed.

The MSC-1990 is contained on a single printer circuit board that plugs into an available slot on the TI-1990 motherboard. The unit costs $4,500, MSC said from 432 Lakeside Drive, Sunnyvale, Calif. 94086.

Small Computer Show Set In Big Apple Next Fall

ENGLEWOOD CLIFFS, N.J. — Hourly lectures and a wide variety of hardware and software demonstrations will highlight the Fourth Annual National Small Computer Show, scheduled to take place Oct. 30-Nov. 1 at New York's Coliseum.

This year's show will focus on both data and word processing applications. Its seminars will include an introduction to small business machines and discussions on future hardware, educational software for schools, law office systems and computer-based medical retrieval methods.

The sessions will also cover the uses of Pascal in business functions and contain an overview of process control.

Complete information on the show will be available in May from the show office at 110 Charlotte Place, Englewood Cliffs, N.J. 07632.

Tape Controller/Formatter Fits LSI-11 Micro Series

SANTA ANA, Calif. — Emulex Corp. has unveiled a dual-density tape controller/formatter for the Digital Equipment Corp. LSI-11 microcomputer series.

The TC01 controller is completely compatible with the TU10-TM11 tape subsystems made by DEC for its LSI-11, LSI-11/2 and LSI-11/23 microcomputers, according to Emulex.

The controller can be used with any industry-standard reel-to-reel magnetic tape drive operating at speeds up to 75 in./sec. It provides switch-selectable recording in either NRZ format at 200- to 800 bit/in. or in phase-encoded (PE) format at 1,600 bit/in., a spokesman said.

Installed in two existing quad slots of a standard Q Bus backplane or system unit, the TC01 executes all existing DEC PDP-11 system and diagnostic software for the TU10/TM11 subsystems, he claimed.

The controller's microprocessor program includes a built-in set of controller self-test and extended subsystem diagnostics, the spokesman added.

First deliveries of the TC01 are scheduled for June. The units cost $1,875 each in quantities of 50 or more, the Emulex spokesman said from 2001 E. Deere Ave., Santa Ana, Calif. 92705.

Course Scheduled in July On Micro Interfacing

LEXINGTON, Va. — A two-week course covering the fundamentals of microcomputer interfacing will be offered here on July 14-25 by the Virginia Military Institute (VMI).

The seminar will focus on the Z80 microprocessor and consist of a hands-on laboratory with Radio Shack's TRS-80 microcomputer. Topics will include interfacing, flags and interrupts, computer I/O, serial communications and an optional introduction to the Z80 assembly language, a spokesman stated.

Graduate or continuing education credits will be awarded upon successful completion of the course. Tuition, not including room or meal charges, is $450 per student.

Additional information on the program is available from Dr. Philip B. Peters, the course coordinator, in the Department of Physics, VMI, Lexington, Va. 24450.

Zendex Lops 25% Off Price Of Disk Drive Controller

DUBLIN, Calif. — Zendex Corp. has reduced by more than 25% the price of its flexible disk drive controller, designed to fit into one chassis slot and emulate Intel Corp. 210, 202 and similar model controllers.

The Model ZX-4DD controller now costs $950 in single quantities. It previously carried a $1,290 price tag.

The controller is said to be completely hardware-, and software-compatible with Intel's and National Semiconductor Corp.'s single-board computers and Multibus systems. In addition, the device can be changed from IBM 3740 single-density format to System/34 double-density disk drive format by adding a push-on jumper.

The unit features an 8085A MPU for intelligent disk control and an emulation program in a socketed erasable programmable read-only memory that can be customized to various applications.

Zendex is at 6398 Dougherty Road, Dublin, Calif. 94566.

Manufacturing Detailed

WESTBORO, Mass. — An eight-page brochure describing the use and applicability of Data General Corp. systems in manufacturing environments is available free from the firm's Communications Services Division.

"You Make The Manufacturing Decisions. We Help Make You Right" highlights both hardware and software features of DG's Eclipse and Commercial Systems processors.

Copies of the brochure can be obtained from DG's Department M.S. C 228, 4400 Computer Drive, Westboro, Mass. 01580.

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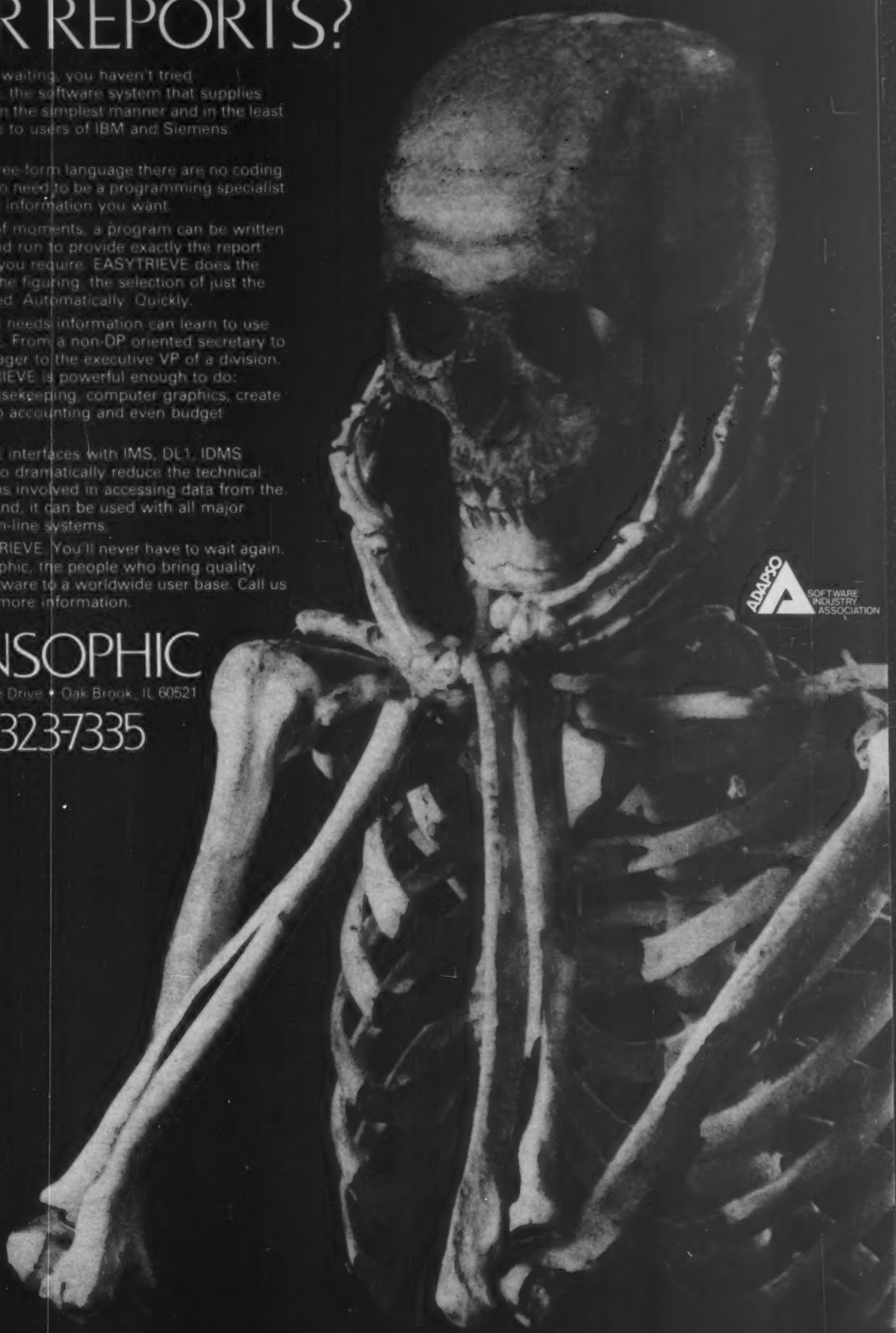

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A new and comprehensive treatment of theory and principals of database systems. Includes descriptions of actual database systems and Query Languages such as ISBL, QUEL, Query-by-Example and SEQUEL. Many examples and exercises are also included. Contents include Physical Data Organization, the Three Great Data Models, Data Manipulation Languages for the Relational Model, Query Optimization, IMS: A hierarchical System, Protecting the Database against Misuse and Concurrent Operations on the Database. $19.95

IB056. **Computer-Readable Data Bases: A Directory and Data Sourcebook, 1979 edition,** Martha E. Williams.
This is by far the most up to date, comprehensive directory of machine-readable data bases ever published. The 1979 edition lists more than 500 data bases worldwide and contains more than 1000 pages. Several indexes speed location of desired information. $95.00

WJ045. **A Guide to the Successful Management of Computer Projects,** Hamish Donaldson.
Now go step-by-step through every phase of a computer project, both mainframe and minicomputer, batch and interactive computing, and get a complete methodology that provides practical help for completion of projects on time and on budget. This new book is unusually comprehensive and universal in its applications. As such it can be adopted as a "standards manual" for systems analysts and programmers. $32.95

UC090. **Compatible Fortran,** A Colin Day.
This book is designed to produce a Fortran language which is truly compatible between computers. Standard Fortran, also known as Fortran IV, is typically used for intermachine compatibility, but in practice, most standard Fortran programs do not follow the standards exactly, and many add facilities to the language which are helpful to the programmer but are not defined in the standard. Colin Day defines a subset of standard Fortran which he calls Compatible Fortran, and which, if followed, can make program interchange a practical reality. $16.95

SC086. **Fundamentals of Data Structures,** Ellis Horowitz and Sartaj Sahni.
This book includes all of the topics important to data structures, including stacks, queues, lists, tress, hashing, sorting, searching, graphs and files. All of the algorithms are expressed in a structured form using a simple language close to PL/I, ALGOL or structured Fortran. $19.95

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As the 1980's unfold, new technologies and new economic forces are at work to turn the familiar television screen into a true information terminal, a phenomenon called videotext. This book provides a state-of-the-art report on what's happening in the U.S. and around the world in CEEFAX, viewdata, ANTIOPE, Telidon and related videotext systems. $24.95

WJ095. **Modeling Large Systems,** Peter C. Roberts.
How to use second-level models to delimit the future. This book sets world modelling in the context of scientific activity, approaching the accuracy, the methodology and the potential through the eyes of a scientist. Topics discussed include science and systems; natural ripples; prediction; control and world models. All text is on an introductory level and shows the constraints and conditions necessary for developing a satisfactory model. $17.95

SC084. **Pascal: An Introduction to Methodical Programming,** William Findlay and David Watt.
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UC088. **The Microprocessor and Its Application,** David Aspinall, Editor.
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WJ094. **A Participative Approach to Computer Design,** Enid Mumford and Don Henshall.
How to design computer systems that incorporate the human factor is the subject of this new book. It explains why office or shop-floor employees should have a major design role in computer systems, especially in terms of work organization and task structures, and shows how this involvement can lead to increased efficiency and job satisfaction. The book also explains how users can be given the skills to diagnose their own problems, set efficiency and job satisfaction targets, and develop alternative forms of work organization. The gains and problems associated with the participative approach to systems design are analyzed in depth. $19.95

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Asks Court for Summary Judgment

Adapso Fighting Citibank DP Offerings

By Jake Kirchner
CW Washington Bureau

NEW YORK — The Association of Data Processing Service Organizations (Adapso) has asked the U.S District Court here for a summary judgement in its continuing fight to halt DP services offered by Citibank of New York.

Adapso's March 26 motion asks the court to stop Citibank from offering what the association claims are commercial DP services unrelated to bank activities and declare them unlawful under the National Bank Act. The law restricts banks to banking or related services.

At the same time, the association asked the court to declare that the Comptroller of the Currency's "acquienscence in Citibank's unlawful conduct" is itself illegal and should not be construed as authorizing other banks to offer similar DP services on a commercial basis.

Adapso is also pursuing the matter with the Federal Reserve Board [CW, Oct. 15] and has asked Congress to amend the Bank Holding Company Act to specifically forbid banks from offering services not directly related to normal banking activities [CW, July 9].

"Banks do not belong in the business of general computer services any more than computer service companies belong in banking," Adapso Executive Vice-President Jerome L. Dreyer said in a statement released March 26.

"The banks have an unfair competitive advantage over companies solely in computer services because of the banks' ability to 'tie' their banking services to their computer services and the potential for a bank to 'cross-subsidize' their computer services business with resources derived from their banking enterprises," Dreyer said.

Citibank started offering access to its computers to nonbanking customers in 1976, the Adapso motion noted, and is currently offering remote DP services, general-purpose time-sharing and software products to the public.

Citibanks's services include an interactive credit analysis system, an on-line financial data base, securities data base, investment and economic planning software and software design and support.

Offered under its Citishare Division, the services are accessible from outside New York City over the Tymnet network of Tymshare, Inc. The bank has asked the Federal Reserve for permission to establish Citishare as a wholly owned subsidiary.

Citibank Intentions

Given this extensive list of activities, "Citibank appears to be intent upon becoming a major commercial provider of a wide range of data processing services," Adapso argued. The motion also noted Citibank's 1979 acquisition of Lexar Corp. and its word processing and office automation products.

"Citibank obviously has no intention of limiting its business to the business of banking," Adapso said.

"It is clear," Adapso said, that the Comptroller of the Currency "has no intention of seeing to it that Citibank — or any other national bank, for that matter — confines its activities to the business of banking."

Saying Citibank's activities are undisputedly unauthorized by federal law, Adapso asked the court to declare the Citibank services unlawful and force the bank to stop offering them. The association also asked that the comptroller's "authorization of an acquiescence in Citibank's unlawful conduct" be found illegal and ordered stopped.

General Automation Plans Move Into 'Factory of the Future'

ANAHEIM, Calif. — After a poor financial showing for the first six months of this fiscal year, General Automation, Inc. (GA) has announced it will move its development and production resources into the "Factory of the Future" environment.

Although the company claimed this does not indicate a dramatic shift in direction, but rather a move to focus its diverse interests, the announcement came after a troubled six-month period preceded by an unlucrative 1979 fiscal year, in which profits dropped 53% [CW, Oct. 1].

The poor showing for the second quarter was attributed to continuing losses by various European operations and Tal-Star, the company's subsidiary in the newspaper industry.

GA does not foresee recovering in the second half of its fiscal year to make up for its current losses.

Restructured Businesses

In an attempt to restore fiscal controls, GA restructured five of its businesses last year, but that effort apparently was not enough to turn the company around sufficiently. The firm has received waivers from its banks concerning certain loan covenant violations and its currently renegotiating its loan agreements, the firm said.

As part of its move to reallocate resources, GA will discontinue operations at Tal-Star, discharging or settling all obligations to its customers and providing ongoing maintenance through its customer service department.

The company indicated that even with the allocation of resources to factory automation and the discontinuance of Tal-Star, its broad customer base would continue to be served.

In addition to these moves, GA is continuing its discussions with several domestic and foreign corporations in connection with the possible purchase of the company or the investment of new equity into the company, but added that the discussions are preliminary.

The firm reported a net loss for the first half of the year of $1,742,000 or 69 cents per share compared with net income of $1,741,000 or 66 cents per share for the previous year, which included extraordinary credits of $540,000 or 20 cents per share compared with net income of $714,000 or 27 cents per share in income tax benefits.

Net loss for the second quarter was $1,088,000 or 43 cents per share in 1979. The 1979 net income included $382,000 or 14 cents per share in income tax benefits.

Revenues for the second quarter ended January 26, 1980 totaled $32,078,000 compared with $26,087,000 for the year ago period. Revenues for the six months were $62,004,000 compared with $53,242,000 for the previous year's time period.

IDC Reports Slow Increases

Results Mixed on Mini Growth

WALTHAM, Mass. — Minicomputer growth shows a mixed picture, with unit growth slipping but revenues continuing to increase steadily, although at a slower pace, according to International Data Corp. (IDC).

In a report entitled "The Minicomputer Marketplace — 1979," results showed 1978 revenues — approximately $3.65 billion — up 37% over 1977 levels, although with a decrease in the unit growth rate. The decline is expected to continue steadily during the next several years with demand dropping, particularly among OEM customers, according to IDC.

Despite the reduced shipments, revenues will continue to show healthy, albeit slower growth, increasing 29% each year through 1983. At that time the minicomputer market will be worth approximately $13 billion (with expectations for unit shipments reaching 235,000 units), the report indicated.

Bracing for Downturn

IDC researchers noted that some vendors such as Digital Equipment Corp. are already preparing for the downturn by both cutting back on production and building on new plant sites.

The next years will see an increasing emphasis on service, software and add-on peripherals — all of which account for the projected revenue increases through 1983. Some vendors are even actively pursuing the peripheral equipment market on an independent basis, according to the research firm.

The OEM portion of the mini market is expected to hit a plateau within the next few years, the report showed. Although marketing to end users is more costly, many manu-

(Continued on Page 74)

Inforex Agrees to Pay Lenders

BURLINGTON, Mass. — Inforex, Inc. has agreed to pay its secured lenders $36.4 million in principle and interest over the next six years.

The agreement also obliges Inforex to issue to the credit group warrants for 10% of the fully diluted equity of the company. The agreement further states that payments after the first $25 million are contingent of the company's fiscal performance.

The firm, which filed for Chapter 11 on Oct. 23, noted that the filing plan for reorganization was tentative and subject to a number of conditions.

The proposed settlement is in addition to nearly $2.6 million paid to the secured creditors group since the firm began to operate in Chapter 11. Limits are set for settlement terms with other creditor groups as well.

No agreement has been reached, however, with committees representing the holders of the firm's 10-5/8% debentures due 1998 and of its general unsecured debt.

Inforex, which expects fourth-quarter operating losses and substantial losses for the entire year resulting from operations, adjustments and writedowns, plans to make the figures available sometime this month.

China to Host Electronics Show for U.S. Firms

NEW YORK — U.S. computer vendors will be able to demonstrate their products at Electronics/China 80, the first exhibition for U.S. Companies in the People's Republic of China.

The Chinese government requested an exhibition by U.S. companies, their subsidiaries and affiliates shortly after China was granted most-favored-nation status.

U.S.-China Trade Consultants, Inc. of Washington, D.C., will sponsor the show, which is being organized by Clapp & Poliak, New York. The exhibit will involve demonstrations as well as face-to-face discussions.

Scheduled for Aug. 14-24, the show will take place in Guangzhou (Canton). In addition to computer equipment, products to be demonstrated at the show will include system elements, test instrumentation, circuit components, production equipment, production systems and materials.

Since China has received most-favored-nation status, U.S. companies may be able to obtain credit from the U.S. Import-Export Bank to help finance exports to China, a Clapp & Poliak spokesman noted.

The exhibit sponsors will provide an 80-sq-ft booth, marketing counsel, interpreters, private rooms for conducting negotiations and hotel and travel arrangements, exclusive of air fare and hotel costs, in a package plan costing $5,000.

Further information can be obtained from Expoconsul, Inc., a division of Clapp & Poliak, at Princeton-Windsor Office Park, P.O. Box 277, Princeton, N.J. 08550.

Telefile to Restructure Debt

IRVINE, Calif. — Telefile Computer Corp. has arrived at an agreement in principle with the First National Bank of Chicago, its primary lender, for restructuring its debt.

Previously, Telefile was unsure whether it would be able to comply with certain financial covenants specified by First National [CW, Feb. 18].

The conditions of the new agreement are for Telefile to pay off $4,745,000 of the nearly $7.9 million owed to the bank. The major portion of the payments will be made in three installments, one of $1 million on Sept. 30, one of $1.5 million on March 31, 1981 and one of $1.8 million on Sept. 30, 1981

If the schedule is met, the bank will transfer the balance of all amounts owed back to Telefile together with the $3 million of the firm's preferred stock and will relinquish all rights to receive Telefile warrants.

Telefile is planning to introduce the T-85 computer, a Xerox Corp. Sigma 9 emulator which will be in production this summer and will help return profitability to the firm, according to Telefile Chairman S.V. Edens.

Data Dimensions Reports Loss

COS COB, Conn. — Data Dimensions, Inc. reported a loss of $1,687,000 or $1.55 per share in 1979 on revenues of $13,929,000 compared with 1978's record revenues and profits of $15,707,000 and $653,000 or 80 cents per share.

Revenues for the latest quarter totaled $3,352,000, a decline of 18% from the $4,098,000 figure of a year ago. The net loss was $524,000 or 47 cents per share as compared with a profit of $103,000 or 10 cents per share for the same 1978 period.

President Lester M. Gottlieb attributed the poor financial showing to the firm's difficulty in obtaining adequate and timely deliveries from the suppliers.

Proceeds from the recent sale of a large portion of Data Dimensions' lease base of nonintelligent terminals and its Maintenance Division to Computrend, Inc., Burlington, Mass., and the sale of its portfolio of Paradyne Corp. equipment back to the manufacturer helped reduce the firm's bank indebtedness from $6,200,000 to $2,400,000.

Data Dimensions has also agreed to act as Computrend's agent for the sale, rental and lease of nonintelligent terminals, multiplexers and modems, allowing Data Dimensions to focus its resources on intelligent terminals and small systems, according to Gottlieb.

Gottlieb does not expect the company to return to profitability on an operating basis until the second half of this year.

Nickels & Dimes

Datapoint Corp.'s board of directors has approved a two-for-one split of the firm's common stock in the form of a 100% stock dividend. The move will increase the number of shares outstanding to 8.4 million. The additional shares will be issued on April 11 to shareholders of record March 21.

$$$

Data General Corp. has arranged up to a $100 million line of short-term credit with a group of domestic and foreign banks.

$$$

Documation, Inc. has reached an agreement in principle for the sale of up to $20 million of equipment under one- and two-year leases to Lease Financing Corp. (LFC). In addition, LFC's European operating subsidiaries have signed agreements with several third-party European leasing firms totaling some $6 million for the financing of leases in Western Europe.

Documation also said it has centered a $6.5 million unsecured 90-day note arrangement with a group of U.S. banks which will serve as bridge financing until the firm finalizes a $45 million multinational revolving credit agreement.

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DTS Head Cites Reasons For Disappointing Year

By Connie Winkler
CW Staff

NEW YORK — It seems everything Data Terminal Systems, Inc. (DTS) tried last year to increase profits backfired, but president Dr. Robert F. Collings says DTS has learned from mistakes and expects a good fiscal 1981.

The point-of-sale (POS) terminal and electronic cash register market, however, will be a new one, influenced by IBM's January entry — and possibly by soaring interest rates.

At a March 27 New York Society of Security Analysts meeting, Collings attempted to explain what went wrong in fiscal 1980, ended Jan. 31. (Sales were $107.2 milion in the year, vs. $69.4 million the previous year, but net income declined $44 million to $9.6 million.)

Europe Dealers

During the past year, the number two supplier of retail terminals (behind NCR Corp.) sought to expand its European dealer network. Acquisition of these European subsidiaries was "more challenging than anticipated" and accounted for 30 cents per share in direct costs — including high interest on the subsidiaries' debt, Collings said.

In addition, DTS broadened its major account penetration by establishing six regional U.S. branches and providing more customer support to previously unsophisticated users. This was very expensive and "all the benefits have not been realized," the DTS founder said.

Analysts questioned why DTS was so thinly spread, with 33 stores using DTS product code laser scanners and terminals in 21 states. DTS purposely built a broad base so that customers could see the scanner and terminals in their region at anything from a one-lane convenience store to a 16-lane market, Collings said.

DTS plans to add 300 scanner installations this year.

Component Shortages

DTS experienced component shortages during the year, which caused higher-than-usual cost of goods sold. In the fourth quarter, the cost of goods sold increased by 54.8% vs. 47.8% for the full year.

There were also delays in scanner deliveries to DTS from Spectra-Physics, Inc.

Collings said DTS is negotiating with other scanner suppliers.

In the fourth quarter, more customers chose low-end registers which had lower profit margins.

For 1980, DTS has announced the Model 715 manager's terminal which incorporates a Digital Equipment Corp. PDP-11/23, DEC CRTs and varying options. Increasingly, cash registers are being connected to computer systems, Collings stressed. IBM's two products announced in January have "made most persons in the industry aware of computers and systemization."

DTS does most of its business in supermarkets. Because of 1% profit margins, supermarkets are well suited for the retail business control systems because they can increase profits .5% to 1%, the president said.

Today's economic situation both helps and hinders DTS. Retailers need better control over their operations from the systems, but tight credit could make leasing difficult, Collings said.

OEM Impact Printers Debut

HAYWARD, Calif. — Diablo Systems, Inc. has introduced a series of serial impact printers for OEM word processing, DP and communications applications that can use plastic or metallized daisy wheels interchangeably.

The model 630 printers are at Diablo's low end of the line and are not intended to replace any of the firm's current products, according to Rigdon Currie, vice-president.

Scheduled for initial delivery this month, the Model 630 is the only printer to offer interchangeability between metal, which offers better print quality, and plastic, which offers faster speeds, Currie claimed. Printing speed varies from 32- to 40 char./sec depending on the type of print wheel, type style and text.

Fewer Parts

Denser packaging, incorporation of large-scale integrated circuitry and microprocessor controllers have reduced the number of parts in the units, which will result in improved machine reliability, according to the firm. Diablo claims the printers will operate 1,000 days without failure at a 25% duty cycle.

The printer will cost $860 for the basic mechanism with control electronics and microprocessor interface in OEM quantities of 500. With a communications interface, control panel, power supply and platen, the unit costs $1,705 in OEM quantities of 500.

Diablo is headquartered at 24500 Industrial Blvd., Hayward, Calif.

Itel Planning To Recapitalize Unsecured Debt

SAN FRANCISCO — Itel Corp. is negotiating an agreement with its banks and other private lenders concerning an interim stand-by arrangement and subsequent recapitalization of its unsecured debt.

Itel's unsecured debt is approximately $650 million with $500 million held by its banks and lenders, according to an Itel spokeswoman.

No payments of principle or interest will be made to the banks or to the holders of Itel's unsecured debt until agreement is reached, Itel's board of directors stated.

These scheduled payments include a payment of principle and interest to the banks due March 31, an interest payment due April 1 on the company's Eurobonds and an interest payment due April 15 on the firm's 9-5/8% subordinated debentures.

Itel hopes a decision will be reached within the next few weeks.

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State-of-the-Art Report Ready on Integrated Circuits

SCOTTSDALE, Ariz. — *Status '80 — A Report on the Integrated Circuit Industry*, an annual state-of-the-art publication, is available from Integrated Circuit Engineering Corp., an independent technical organization.

The 120-page report provides information on the worldwide business climate for integrated circuits (IC), key applications and trends, profiles of the major IC manufacturers, key technologies and in-house manufacturing.

The appendix includes a glossary of microelectronic terms and listings of organizations providing services to the IC industry such as market reports, testing and microanalysis services.

Status '80 costs $95; additional copies are priced at $75 each from Integrated Circuit Engineering Corp., 6710 E. Camelback Road, Scottsdale, Ariz. 85251.

Special Sessions Scheduled To Run With Semicon/West

SAN MATEO, Calif — Three market research firms will participate in a three-day technical session program to be held concurrently with Semicon/-West, May 20-22 at the San Mateo County Fairgrounds.

Representatives of Dataquest, Inc. Integrated Circuit Engineering Corp. and Technical Ventures will discuss market trends as introductions to the technical presentations on fine-line lithography, testing and wafer fabrication.

Robert C. Fink, marketing director at Veeco Instruments, Inc. in Plainview, N.Y., will chair the sessions program.

The first day of the technical sessions will feature fine-line lithography and begin with a presentation by Glen R. Madland, president of Integrated Circuit. The second day will focus on semiconductor testing and will feature Jerry D. Hutcheson, president of Technical Ventures.

Registration information is available from the show manager, the Semiconductor Equipment and Materials Institute, Inc., Suite 212, 625 Ellis St., Mountain View, Calif. 94043.

Report Gives Mixed Results

(Continued from Page 69)

facturers will go in that direction in order to cash in on the higher revenues accruing from service, software and peripherals.

IDC sees the most successful vendors as those with a strong end-user base rather than OEM business and projects a 60-40 end user-OEM revenue split becoming the norm.

The research firm found significant increases in overseas revenues experienced by many U.S.-based suppliers. The reasons stem from a generally higher average value per system for overseas shipments and because the declining dollar is offering international users the opportunity to make especially advantageous purchases.

By 1983, 39% of all revenues for U.S. manufacturers will be from overseas business, with international shipments reaching 32% of the total, IDC said.

The economic slowdown, the trend toward distributed data processing, the introduction of new applications and IBM's late delivery problems will all impact the minicomputer market.

The report asserts that the minicomputer market appears to be strong despite some difficulties.

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Report Cites Vendor Discontent

Laws Seen Impeding Communications Exports

CAMBRIDGE, Mass. — Third World and other international telecommunications markets show promise for the U.S. telecommunications vendors, but federal laws could impede major exporting efforts, according to a study by The Yankee Group, a market analysis and research firm.

Increased competition is forcing American manufacturers to expand their markets abroad where, in addition to competing against European, Japanese and Canadian suppliers, they must also contend with federal guidelines they themselves oppose, The Yankee Group reported.

Telecommunications vendors complain that the U.S. firms operate at a disadvantage because of federal restrictions, such as the Foreign Corrupt Practices Act (which outlaws payment of bribes), taxation of U.S. citizens who live and work in other countries, antitrust legislation, "hypocritical" human-rights sanctions, the lack of government-arranged "soft" loans and lack of federal backing for commercially oriented research and development.

Competition in the international telecommunications market is between countries, not companies, the report said. While diplomacy, financing and technology are needed to win contracts, the U.S. offers only one of these — advanced technology. That is not always incentive enough, according to the vendors.

Telecommunications executives are calling for the federal government to reexamine its role in trade and to bolster equipment exports rather than impede them, the report stated.

Closed vs. Open Markets

Distinguishing between closed markets (such as Europe, Japan and Brazil) and open markets (most of the Third World countries), the study outlined the sales prospects for each area.

According to the report, U.S. telecommunications vendors have little chance of competing in the closed markets unless they offer some specialized or highly advanced technology. Third World markets — particularly those which export oil, such as Nigeria or Saudi Arabia — are, however, still open for American business, The Yankee Group research showed.

The report analyzed the changes in the international voice and data communications markets caused by regulatory and technological advances and also described technological progress that will have an impact on international carrier service.

New product opportunities were identified in the report, especially in relation to Third World markets. Case studies of three U.S. companies that have been successful in the foreign market were presented.

Entitled "The International Telecommunications Market," the report is part of the firm's continuing series, "Communications/Information Systems Planning Service." The Yankee Group can be reached at P.O. Box 43, Harvard Square, Cambridge, Mass. 02138

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Zurcher Named To New Post

SUNNYVALE, Calif. — Frank Zurcher has been appointed to the newly created positon of president, chief operating officer and member of the board of directors of Advanced Micro Computers, the systems subsidiary of Advanced Micro Devices, Inc.

Zurcher comes to the post from National Semiconductor Corp., where he acted as group director of proprietary systems. Before joining National Semiconductor, Zurcher spent eight years with Burroughs Corp., leaving there as a vice-president and group executive of the small systems group.

Advanced Micro Computers became a subsidiary of Advanced Micro Devices in March 1979 and is completing its first full fiscal year with revenues greater the $6 million, a spokesman said.

The firm produces microprocessor development systems to support the integrated circuits of Advanced Micro Devices, as well as a variety of board-level products.

Zurcher will report to W.J. Sanders III, chairman, president and chief executive officer of Advanced Micro Devices.

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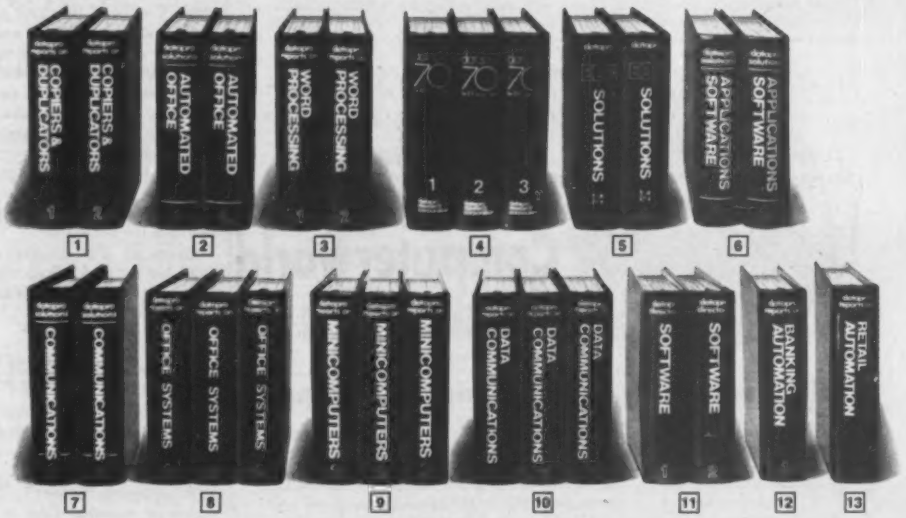

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ADR '79 Earnings Slump; Revenues Hit Record Highs

PRINCETON, N.J. — Although Applied Data Research, Inc. (ADR) was disappointed with its net earnings for the year, revenues for 1979 showed record highs.

Revenues for the firm were reported at $28.7 million from operations, up 27% from year-ago figures. Net earnings were $524,657, or 38 cents per share compared with $1.98 million, or $1.41 per share in 1978.

Start-up efforts accounted for the 1979 results, which were well below expectations, according to ADR's president, John R. Bennett.

Commenting on the 1979 results, Bennett noted that the Datacom product line operated unprofitably last year, its first full year with ADR. Moreover, large amounts of money were expended to fund research and development necessary for an on-line management information system for the cable TV industry. Both areas are expected to pick up in 1980 and generate more revenues, Bennett said.

The company's Software Products Division continued its strong revenue and earnings performance in 1979 and the firm's newly acquired five European subsidiaries operated profitably also, according to ADR.

Cbema Issues Review Periods

WASHINGTON, D.C. — Two public review comment periods have been called for by the X3 Secretariat of the Computer and Business Equipment Manufacturers Association (Cbema).

The first involves a draft proposed American National Standard on BSR X3.89, Unrecorded Single-Disk, Double-Density Cartridge and has a comment deadline of June 23.

The draft standard presents the general, physical and magnetic requirements for interchangeability of the single-disk cartridge as required to achieve unrecorded cartridge interchange between disk storage lines and associated information processing systems. Copies of the draft are available for $6.50 from Cbema, and all orders must be prepaid and accompanied by a self-addressed mailing label.

The second comment period issues from the X3 Technical Committee, B1, Magnetic Tape — responsible for the maintenance of American National Standard X3.14, recorded Magnetic Tape for Information Interchange — has recommended that its parent, X3, reaffirm the standard.

Copies of this 60-day review are available for $3.25 from the American National Standards Institute, 1430 Broadway, New York, N.Y. 10018.

Cbema is located at Suite 1200, 1828 L street, N.W., Washington, D.C. 20036.

Latin America Focus of Meet

MIAMI — A seminar concerning the growing Latin American computer and telecommunications markets will be held in Washington, D.C., at the Mayflower Hotel, June 30, July 1 and 2, 1980.

Sponsored by the City of Miami, in cooperation with the U.S. department of Commerce, the seminar will include panelists from the National Telecommunications and Information Administration, Office of International Communications Policy Department of State, the Inter-American Development Bank, Computer Business Equipment Manufacturers Association and the Conferencias Interamericanas de Telecommunicaciones, OAS.

Further seminar information is available from Latin American Communications, 98 Holmes St., North Quincy, Mass. 02171.

Executive Corner

• Norand Corp. has made four executive appointments: Michael H. Dunn to vice-president of marketing, Richard C. McCarty to vice-president of administration, Robert F. Warn to director of national sales and Tom E. Derr to manager of industry marketing.

• John D. Stong has been elected vice-president of manufacturing for Beehive International.

• Dick Fahling has been promoted to vice-president of marketing for Cibar, Inc.

• Arthur W. Fonda has been named vice-president of operations for Ramtek Corp. and Jon F. Fowler and Steven V. Cope have been promoted to group vice-presidents.

• Tom Breslin has joined Systems & Computer Technology Corp. as principal consultant to the Software Development Group. Paul Czesak has joined the firm in a senior management position in the Software Development Group.

• Paul L. Klein has been appointed vice-president of marketing for Memorex Corp.'s Communications Group.

• Joseph Romasco has been named vice-president of advanced peripheral products and Jacob Powell as acting vice-president of marketing for Okidata Corp.

• Quentin J. Hietpas has been appointed vice-president of public relations for Control Data Corp.

• Dr. Michael D. Godfrey has been named director of research for Univac.

• Gerard F. Cunningham has been appointed marketing vice-president for Interscience Systems, Inc.

• Frank G. D'Angelo has been promoted to vice-president, Bank Systems Division and general manager of automatic banking systems and services for Diebold, Inc.

• Earl J. Hansen has been elected executive vice-president and Edwin J. Dinderman has been elected vice-president of manufacturing at Astrocom Corp.

• Applied Digital Data Systems, Inc. has appointed Jerome Nunn as vice-president of operations.

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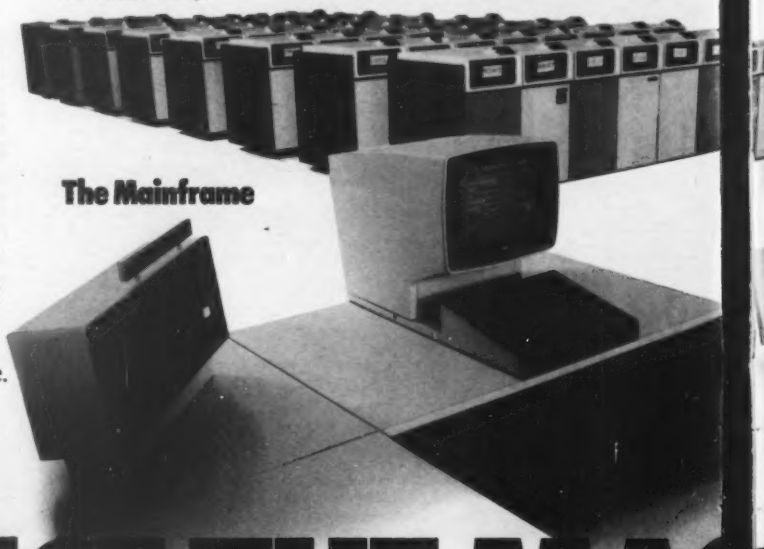

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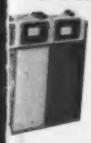

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wittenberg University

Director of University Computing

Wittenberg University announces the opening of a search for a Director of University Computing. Wittenberg is an undergraduate liberal arts institution affiliated with the Lutheran Church in America. Enrollment is approximately 2,300 full-time students.

Duties: Develop and maintain computing facilities and staff, and manage the Computing Center so as to provide a maximum level of support for academic and administrative computing. Coordinate the development of academic and administrative services so as to promote the widest possible use of the computer consistent with sound academic and administrative practice and the available resources of the University.

Qualifications: Master's or Ph.D. in Computer Science preferred or equivalent experience; must be familiar with administrative and instructional uses of computing; must have experience in computing, preferably in an academic setting; must have administrative ability.

Deadline for application is April 30, 1980. Interested candidates should send a letter of application and resume together with the names and addresses of at least three references to: Dr. Glenn Wilson, Chairperson, Search Committee.

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DP SALES/MKTG

Major int'l vendor seeks "aggressive" DP sales background (2-4 yrs - Prefer Honeywell or Burroughs) to penetrate Portland marketplace. Super career growth. Salary to $22,000+++

PROGRAMMER/ANALYST(S)

Leading banking firm wants 3+ yrs. strong COBOL background, 370-MVS, IMS, & DBDC. Loans, payroll, DDA, on-line teller & item processing preferred. Salary to $24,000 DOE

SR. PROG/ANALYST

Prestigious manufacturer has excellent opportunity for 3-5 yr. exp. in COBOL with mgt./planning OR distribution/marketing application. Prefer on-line and/or Database. Salary to $23,000 DOE

Bob Clawson
ROBERT HALF
of Portland, Inc.
One S.W. Columbia, Suite 650
Portland, OR 97258
(503) 222-9778

PALO ALTO NORTHERN CALIFORNIA

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IBM or Burroughs experience in a manufacturing or financial environment. To $26,000

RPG II MANAGERS OR PROG.

System 3/15D or System 32, 34 installations. To $25,000

EDP AUDITORS

IBM OS & DOS environments require EDP Auditors at all levels. To $30,000

SYSTEMS PROGRAMMERS

IBM, OS & DOS needed immediately. To $32,000

DATA BASE ANALYST

Experience with DMS, DL1, ADABAS, IDMS or CICS. To $32,000

COBOL PROG./ANALYST

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Over 1000 positions in Northern California are currently open. If you have experience in:
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Excellent oppty. for an aggressive individual w/IBM and IMS exp. This position entails resp. for design and implementation of a major point-of-sale inventory control system. Growth co w/top benefits. Salary to $33,000.

SR SYSTEMS ANALYST

Locally based nat'l corp is seeking a strong IMS bkgd. in an on-line env. to work w/fin'l services. DDB/DC exp. OS/MVS, and DL/1 are big pluses. Co. stays on the cutting edge of technology. Salary to $29,000.

MKTG SUPPORT ANALYST

Are you more than a software support analyst? High visibility position w/outgoing progressive Mpls firm. Work w/salesmen on software installation, presentations, training, and follow-up. IBM on-line DOS or OS bkgd nec'y. Some air travel, outstanding benefits and compensation.

DP MGR

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Ron Dykstra
or
Kathi Grant
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of Minnesota, Inc.
2236 IDS Center
Minneapolis, MN 55402
(612) 339-9001

SEATTLE

WASHINGTON — manufacturer needs several experienced programmers for new applications work. Prefer 3 to 6 years DEC RSTS-E background. To $20,000 plus relocation.

ALASKA — firm seeks several programmer/analysts with at least 1 year of hands-on CICS applications experience. Outstanding compensation includes base salary around $24,000 plus cost-of-living adjustment, full relocation and excellent benefits.

IDAHO — company looking for bright programmer/analyst with 1 year BAL and CICS experience. COBOL a plus. To $21,000 plus excellent benefits. Relocation paid.

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of Seattle, Inc.
1301-5th Avenue #2626
Seattle, WA 98101
(206) 624-9000

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Call Karen
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Washington, D.C. 20014
(301) 652-1960

COLUMBUS

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Newly created local position offers rare oppty. for experienced MGR. Project teams will report and respond directly to you. Responsibilities also include systems development. Management exp. and refined communications skills required. This position reports to DP manager in major manufacturing environment.

E.F.T.S. PROJECT MGR.

Position available to lead out implementation and development team for sophisticated 1980 banking concept. E.F.T.S. and banking knowledge required. Leadership potential a must. Full relocation and real estate assistance benefits. Position one person away from VP. Salary $25-32,000.

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IMS

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DP MGR

DOS/VS Cobol - RPG. Nice professional co. $22,000

370/DOS

Mfg applications - Cobol on line-assemb. $20,000

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Milwaukee, WI 53202
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ST. LOUIS

EDP AUDITOR

At least 2 yrs. DP exp., including some COBOL programming, and 1 or more yrs. EDP audit will qualify you for this position vacated by promotion. A CPA, CIA, CDP or CMA; and/or software exp. is a big plus! To Low $30's

SYSTEMS ANALYST MARKETING SUPPORT

Pre/post-sales, customer training, equipment presentations are all a part of this unique position with a Fortune 100 firm. 5 yrs. IBM OS/DOS, COBOL and/or BAL will qualify you. To $27,000

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Fill a unique position with a major EDP vendor. Data base, data dictionary experience required. At least 2 yrs. experience will provide unusual corporate visibility. To $35,000

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Degree in C/S, 10 years EDP experience required in systems or product development. Marketing orientation, management experience also required. To $40,000+

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Director of MIS

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PROGRAMMER ANALYST

Large local distribution co. seeks a programmer analyst with at least 2 yrs of COBOL experience on an IBM 370 DOS-VS systems. Must have a background in business applications. Knowledge of CICS or VSAM files would be helpful. Start to $25,000

There are many other good career opportunities currently available in the Rocky Mt. area. If you are interested in obtaining more information please contact.

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Excellent long-term growth with dynamic manufacturing concern. Applicant should have: Min. 2 yrs. COBOL, Large IBM DOS or OS, Financial and Mfging applications. DL/1, CICS and IMS are a big plus. New hardware on order. Super Benefits. $22,000

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Unique opportunity for advancement. Applicant should have: Min 2 yrs. RPG II, IBM 32, 34 or System 3, design and programming of Gen. Business applications. Person must be ambitious with a strong desire to get ahead. $23,000

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of Atlanta, Inc.
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Atlanta, GA 30326
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IBM 360 DOS/VS Shop. Mfg. Bkg, CICS. COBOL, RPG II. Current in on-line. Austin, TX.
$20,000+ Range.

PROGRAMMER

Commercial & Scientific applications. FORTRAN, RPG desirable. Must 3 Yrs+ structured COBOL. Corpus Christi, TX.
$21,000 up.

SYSTEMS ANALYST

B.A. Deg. Required. APL programming for Real Estate and Market Research Dept. San Antonio, TX. $ Open.

PROG. ANALYST

B.S. Com. Sci., IBM 360-370 COBOL. San Antonio, TX.
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ROBERT HALF of San Antonio, Inc. First Nat'l Bnk Bldg #340 San Antonio, TX 78201 (512) 736-2467

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Create a large teleprocessing/ data base direction using IBM, MVS and IMS/Fast Path. Need 5 years Assembler and banking expertise. SNA networks, MVS, IMS Externals, Degree.

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Research, write and produce project documentation, including system description, specifications and ops manuals. Heavy user interface. 2 years experience with broad background in DP desirable.

EDP AUDITORS

Both operational and financial, focus of project management and controlled development of quality systems. Some COBOL and/or NOMAD preferred, IBM and on-line/DB.

SR. SYSTEMS ANALYST MINI's

Provide for subscribers to perform invoicing, order entry and inventory functions on Mini-Computer installed at site. 2 years COBOL + Misc. Mini language, IBM 370 MVS and solid systems analyst skills needed.

SYSTEMS PROGRAMMERS

Develop hardware configuration, coordinate installation, I/O Gens and control card library updates/ acceptance testing of new operation system releases. 370/303X, MVS, SMP/SYSGEN, Peripherals, configuration design.

QUALITY ASSURANCE ANALYSTS

Develop systems methodologies/ procedures for programmers, analysts, operations, etc.

PROJECT LEADERS

Banking. Will design/implement on-line systems, loans, trust, teller systems.

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Capacity planning for large scale IBM installation. 168/303X IMS environment.

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DATA BASE

Leading Ky. firm needs a data base analyst with 2 years experience in either IMS, DMS, IDMS or total design. The right person will advance quickly. Relocation paid. Salary to $25,000

APPLICATION PROGRAMMERS

If you have 1-5 yrs. experience in Cobol or ALC, knowledge of Life or Property and Casualty insurance, PMS, CFO, ABC, and on-line programming our client is very interested in seeing you. All relocation paid and starting salaries to $23,000.

Tom Williams ROBERT HALF of Louisville, Inc. 1610 Commonwealth Bldg. Louisville, KY 40202 (502) 585-1751

KANSAS CITY

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Midwestern based property and casualty insurance company seeks a proven project manager. Prior experience with design and installation of insurance systems required. Experience in directing multiple projects and utilization of structured techniques in both on line and data base environment preferred. Company utilizes current state of the art technology.
Salary mid $30's.

SYSTEM PROGRAMMER

Expanding suburban data center requires additional technical support. Initial assignments will include MVS support as well as support of IMSDB/DC. One year of either SVS or MVS support required. Salary to high $20's.

SYSTEM ANALYST

Be a part of the new management team installing a 4341. Must be capable of making decisions and taking charge of complete system design of new accounting systems. Proven track record of taking a project from start to finish is required. DOS/VS background preferred. Experience with on line and data base is a plus. Salary to mid $20's with six month review.

JUNIOR ANALYST

Tired of programming and wanting to be trained in Systems Analysis? If you have two years of solid DOS/VS Cobol experience you may qualify to be trained as an analyst for this fast growing firm. Good communication skills and the ability to learn will be required to keep pace in this fast track organization. Complete training in structure design techniques will be provided. Excellent visibility to corporate VP'S.
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Big system challenge — small system environment. Local manufacturer desires a fast track programmer with solid working knowledge of RPG II to take on new development. This state of the art system 34 shop has been recently remodeled, attractive benefits package and starting salary to $20,500.

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Financial firm. Multi CPU. Communication skills. Knowledge of IMS/ROSCOE/LIBRARIAN. Growth shop.
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BOSTON

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Internat. elect. mfr. requires sharp articulate business data processing instructor. Must have EDP industry exp. or educational bkgrd. Interv. & reloc. exp. paid.
Salary $22,000 range.

MANAGEMENT SCIENCES

Major commercial fin'l. institution requires highly analytical indiv. for requirements defin., feasibility studies, statistical surveys & operations research. Must have strong user skills interfacing with all levels of mgmt. Salary $24,000.

MARKETING RER

Prestigious & rapidly growing business software developer seeks low-keyed pro for start-up oppty. Must have solid track record of EDP sales exp. Compensation based on performance with first year earnings realistically.
$35-40,000

APPLICATIONS DEVELOR - N.H.

Highly respected, forward thinking mfr. requires shirtsleeve indiv. for business sys. development. Mini-computer environ. utilizing COBOL, ALC or DIBOL. Unlimited advancement potential. Interv. & reloc. exp. paid. Salary $22,000.

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Progressive services org. seeks innovative indiv. for manual & EDP sys. design & develop. Prior work simplification, MTM, AOC or MCD exp. req'd. Strong oral & written skills a must. Excellent oppty. for the user-oriented analyst. Salary $20,000.

Gerry Bettists ROBERT HALF of Boston, Inc. 100 Summer Street Boston, MA 02110 (617) 423-1200

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PROJECT MANAGER

Consumer goods mfr. located in Western NY needs top notch fin'l. systems analyst. Resp. include corp. admin. sys. implementation; i.e. personnel, payroll, etc. Will act as liaison between corp. MIS & fin'l. mgmt. Must be self-starter able to get the job done. Data center expansion has created this promotable position. Salary $28,000.

PROGRAMMER ANAL.

This newly formed position requires both programming & analysis bkgrd. Highly promotable spot will lead to manager as staff expands. Mfg. & fin'l. systems ideal. IBM Sys 34 installed & running. RPG II is the key.
Salary $25,000.

PROGRAMMER ANALYST

Western N.Y. based mfg. co. needs solid technical bkgrd. including COBOL, DLI, CICS. Must be able to work with little maintenance of mfg., cost acctg. & personnel systems. Outstanding peer group. Salary $25,000.

Pam Siegal ROBERT HALF of Buffalo, Inc. 1310 Liberty Bank Bldg. Buffalo, NY 14202 (716) 842-0801

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MFG. SYSTEMS

Conn. industrial seeks indiv's. with broad mfg. design skills. Will join staff of sr. level internal mgmt. consulting group.
Salaries to $30,000 D.O.E.

TELECOMM. SPECIALIST

Outstanding Central CT firm seeking coordinator of Telecomm. Software (TCAM, NCP, CICS). Desire 3+ yrs. syst. prog. or T.P. exp. First class facility offering full relocation and generous benefits. Salary to $30,000.

DIR. DB/DC RESEARCH

Major fin'l inst. seeks exp. DB/ DC pro. with products such as CICS, DMS, DL/1, IDMS in a MVS/VSAM environ. Develop. & maintain staff. Provide consulting to this multi-div. corp. Must have proven admin. ability.
Salary to $35,000.

Stan Durbas or Paul Meissner ROBERT HALF of Hartford, Inc. 111 Pearl Street Hartford, CT 06103 (203) 278-7170

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MGR. MANAGEMENT SYSTEMS

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SYSTEMS ANALYST

Property & liability ins. giant seeks ins. systems knowl. Must be detailed indiv. with stable track record & good communicative skills. Interviewing & relocation expenses paid.
Salary $25,000.

LEAD PROGRAMER

Exciting & challenging situation awaits the D.P.er who can provide expertise in Financial systems, A/R in particular. IBM 370 COBOL on-line applications. Grow with this dynamic R.I. based communications firm.
Salary $23,000

SYSTEMS ANALYST

Bring your knowl. in the design of systems applicable to a highly complex mfg. environ. such as bill of material, scheduling, MRP & inventory contrl. Outstanding oppty. to join a growth oriented company. Salary $21,000

Dee Ecker ROBERT HALF of Providence, Inc. 400 Turks Head Bldg. Providence, RI 02903 (401) 274-8700

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OS COBOL

STATE OF ART environment insures virtually unlimited growth potential. 3+ years OS COBOL programming experience. IMS experience is a plus. Applications are marketing and financial with the emphasis on analysis. Management possibility in VERY NEAR future. $27,000

MGR SYS 34

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FORTRAN

Key position with integral responsibilities. 1+ years FORTRAN programming in time-sharing environment. Aid in design and implementation of BANKING systems in multi DEC 10 TIME-SHARING system. Heavy user interface. $23,000

PL/1 36K

Plenty of room for growth with this giant importer/exporter. 2+ years PL/1 programming with knowledge of OS JCL and CICS. Responsibilities include conversion of tape oriented acccounting system to ON-LINE. Realistic growth potential in dynamic firm. $26,000

SR. ANALYST

Rare and challenging opportunity with this FORTUNE 100 firm. 2+ years SYSTEMS DESIGN and 2+ years COBOL programming experience. HONEYWELL GCOS experience is a plus. Responsible for the design, implementation and testing of varied applications. High potential.
$28,000

PROJ MGR

Outstanding growth potential with this well known oil conglomerate. 3+ years analysis and design with COBOL programming experience. Manage implementation of new financial systems. N.Y. based company moving data center to northern N.J. in 1981. RECESSION PROOF! $33,000

OS SYSTEMS

Career position offers PROFIT-SHARING, BONUS, and 4 WEEKS VACATION. 3+ years OS SYSTEMS programming. Environment is dual 370/158 OS VS2 going to MVS. Excellent growth potential in pleasant working environment. $30,000

MINI BASIC

Don't pass this up! 2+ years MINI experience with BASIC programming or other MINI programming language. Aid in conversion to HONEYWELL LEVEL 6. Development of all ON-LINE financial applications. Outstanding benefits. $25,000

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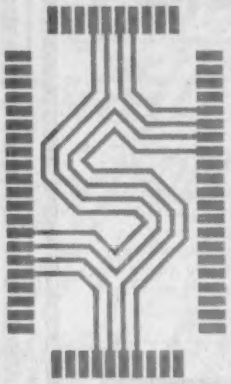

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Here are examples of many excellent New England opportunities.

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FIVE ROMAC OFFICES In Strategic New England Locations	2 Sun Life Park Wellesley Hills, MA 02181 (617) 235-4011	477 Congress Street Portland, ME 04101 (207) 773-4749
One Financial Plaza Hartford, CT 06103 (203) 525-8037	140 Sherman Street Fairfield, CT 06430 (203) 255-9145	1150 New London Avenue Cranston, RI 02920 (401) 463-7600

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Instructor, Assistant or Associate Professor of Data Processing beginning September 1, 1980. Applicant must primarily demonstrate exemplary teaching skills and should have strong knowledge and background in COBOL, BAL, and IBM - JCL. Knowledge of RPG, teleprocessing, business systems, and distributive processing is desirable. Bachelor's degree required, Master's preferred. Position involves day and evening teaching. Salary is $15,000 to $21,000. Application deadline: April 18, 1980. Send letter of application and vitae to: Mr. Gerald R. Camp, Community and Technical College, The University of Akron, Akron, Oh. 44325. The University of Akron is an Equal Opportunity — Affirmative Action Employer.

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If you're an engineer, you should know about us. E-Systems Garland Division is part of a Dallas-based international electronics corporation. We are a recognized leader in solving some of the world's toughest one-of-a-kind problems in advanced electronic systems engineering.

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Just call to qualify. You'll be talking to Tom Shepherd, Manager of Staffing. He and department heads will be inviting a few select engineers to an all-expense-paid trip to our Spring Engineering Open House. It's coming up soon, the weekend of April 20, so call now, weekdays from as early as 7 a.m. to 5 p.m., to get things started. If you're going to be in Dallas on April 20th anyway, please stop by, Sunday 9-5, at our Garland Division Facility, 1200 Jupiter Road (1½ miles north of LBJ Freeway—Jupiter Road exit).

Or send your resume to Tom J. Shepherd, E-Systems, Inc., P.O. Box 226118, Dallas, Texas 75266.

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Sales Responsibilities will include:

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$18,000-$50,000

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MGR., INFORMATION SYSTEMS to $32,000. Ohio $130mm mfg div/"Fortune 500" seeks candidate to direct resources in multi-facility/mfg. Hardware/software/budgets/systems activity. Systems dvlpmt w/degree. Refer AT.

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TECH. CONSULTANT to $28,000. North GA client seeks pro to support eng application software packages. No programming. Little travel. Req's exp in IBM; CDC or DEC hardware. CS or eng deg; Fortran a must. Refer RS.

SOFTWARE ENGRS. to $28,000. Pittsburgh based "Fortune 500" co seeks several software engrs to design & implement software packages in several tech application areas. Req's BS, MS, PhD in EE, ME or Computer Sci w/1+ yrs exp in scientific programming on real time systems. Fortran is essential. Exp w/system 32 computers & operating systems a +. Refer BS.

PROG. & ANALYSTS to $27,000. Large Atlanta service organization exp'ng outstanding growth seeks prg & analysts at all levels. Req's COBOL bkgd + IBM hardware exp. Client believes in extensive training to update skills. Atlanta sub. Refer RS.

RENEWABLE ENERGY-SCIENTIFIC PROGRAMMER to $20,000. "Fortune 100" growth sub in attractive location is expanding its R&D tech. Exceptional challenge for Fortran/Basic prog/analyst w/sophisticated sci application exp. Refer HG.

CONTACT OUR NEAREST OFFICE ABOUT THESE AND OTHER FEE-PAID OPPORTUNITIES. OUR UNIQUE COMPANY OWNED OFFICE SYSTEM ASSURES PERSONAL, CONFIDENTIAL SERVICE

PHILADELPHIA, PA 19102 — S. Burns, 1500 Chestnut St., 215/561-6300
ATLANTA, GA 30346 — H. Spang, 47 Perimeter Center, 404/393-0933
BALTIMORE, MD 21204 — R. Nelson, 409 Washington Ave., 301/296-4500
CHARLOTTE, NC 28232 — J. Schwab, 1742 Southern Natl Ctr., 704/375-0600
CLEVELAND, OH 44131 — A. Thomas, 5755 Granger Road, 216/749-8030
McLEAN, VA 22101 — D. Miller, 7921 Jones Branch Drive, 703/790-1335
NEW YORK, NY 10036 — N. Shanahan, 1211 Ave. of the Americas, 212/840-6930
PITTSBURGH, PA 15222 — B. Sayers, 4 Gateway Center, 412/232-0410
PRINCETON, NJ 08540 — J. Dean, 3490 U.S. Rt. 1, 609/452-8135
WILMINGTON, DE 19810 — H. Greene, 3411 Silverside Rd., 302/478-5150
HOUSTON, TX 77098 — G. Smith, 3000 Richmond Ave., 713/523-5504
LOS ANGELES, CA 90017 — W. McNichols, 707 Wilshire Boulevard, 213/623-3001
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Please send detailed resume, in confidence, to:

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- Develop special part inspection programs, including debug and documentation, and work with customers to determine requirements and to solve problems. BS in Computer Science, Mathematics, or Engineering, plus two to four years experience as a high-level language (FORTRAN, BASIC, etc.) programmer of minicomputers. Related experience will be considered in lieu of degree. Assembly language background desirable but not required.

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Iowa City, Iowa 52240

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Westinghouse

LA Interviews This Tuesday, Wednesday and Thursday; April 8, 9, and 10.

If you are a *Programmer Analyst,* with two years' experience, a thorough knowledge of COBOL and have some exposure to an IBM environment . . . or if you are a seasoned *MVS Systems Programmer* possessing thorough knowledge of OS/MVS Internals, sysgens, dump analysis, and JES-2 . . . you could qualify for a job opportunity that offers:

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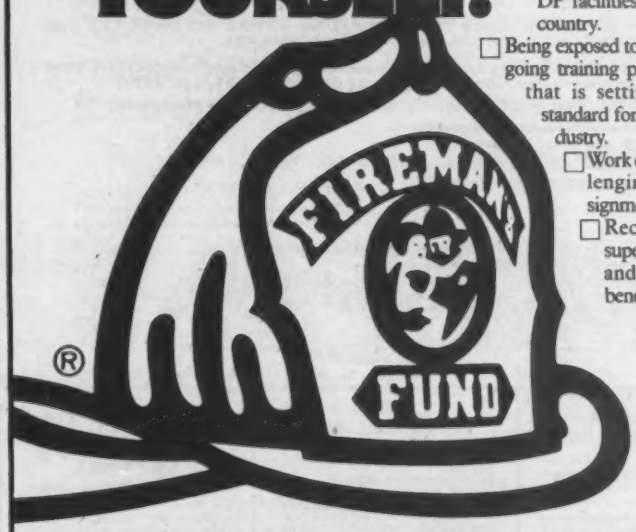

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The Manager of Contracts will establish a state-wide system of administration for over $250M in social and rehabilitative contracted services. Tasks include policies and procedures, contract manuals, provider and supplier evaluation, manpower planning, professional development and general management. **Requirements:** Minimum of B.A. in Business Administration (grad. deg. in law, bus. or govt. pref.) and 5 years' experience in purchasing or subcontract administration. Proven skills in leadership, negotiations and communications in both private and government sectors required.

Salary range: $30 - $35K

Send resume to:

Contract Search
Executive Office of Human Services
Rm. 167 State House
Boston, Mass. 02133
AA/EOE

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IMS DB/DC 1.1.5
DATA DICTIONARY 3.0
DATA MODELING
QUALITY ASSURANCE

Hobart Corporation, a leader in the manufacture of commercial food equipment and KitchenAid appliances, with World Headquarters in Troy, Ohio, is seeking qualified individuals to become members of our Systems Assurance/Data Base Administration Department.

We are looking for a **DATA BASE ADMINISTRATOR** with 2—7 years IMS experience with at least 1—4 years as a DBA. The major responsibility will be in "Data Administration" and "Data Modeling" associated with one of our 8 major business and manufacturing development projects, with additional responsibility working with the "Data Dictionary" and "Technical IMS Data Base Administration".

[DATA is the raw material of information and a major asset to the corporation; therefore, data must be identifiable, collectable, inventoriable, controllable and reusable.]

We are also seeking a **SENIOR ANALYST** with 5—7 years experience. The successful candidate will have experience with systems design reviews, methodologies and standards, data dictionaries, and training and education of D.P. professionals. You will aid the Department in "Data Dictionary Administration" and "Systems Assurance/Quality Assurance" of the Systems Development Projects.

[A SYSTEM is a product that can be engineered, and consists of known components and relationships between components. A METHODOLOGY is a way of engineering a system.]

Our technical environment consists of an IBM 3033/N8; MVS 3.8; IMS DB/DC 1.1.5; Data Dictionary 3.0; CICS 1.4; TSO/SPF; SNA-SDLC; and multiple IBM 8100's.

If you're interested in joining an aggressive implementation and support team, send your resume and salary history or call (513) 335-7171, Ext. 2215.

James L. Boerger, Supervisor, Professional & Technical Placement.

HOBART CORPORATION

WORLD HEADQUARTERS
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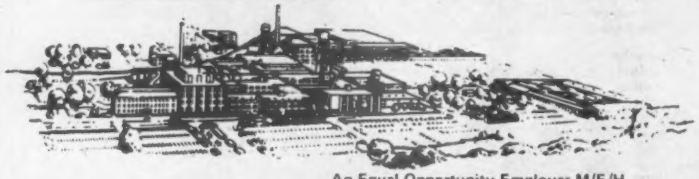

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Saudi Arabia

WHAT WE'RE LOOKING FOR:

To meet growing requirements in support of Lockheed's Air Traffic Control Systems installations in Saudi Arabia, we are seeking a number of skilled software engineers, who will comprise a Data Systems Support Group located in Jeddah, and who will be responsible for the testing, maintenance and support of the ATC systems software. Candidates should have a degree in computer science or electrical engineering with experience in real-time systems programming including assembly language and hands-on operation.

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A major subsidiary of the Lockheed Corporation located in central New Jersey. In addition to a competitive salary and a liberal benefit program, we offer an excellent overseas incentive/bonus package.

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ManTech offers growth opportunity, excellent benefits program and the opportunity to work with talented associates.

For details call (collect) Barry Munson, (202) 870-3842 or (301) 863-7445. Or send resume to: ManTech International Corporation, 18 Shangri-La Drive, Lexington Park, MD 20653. EOE/AAP Employer M/F.

Dallas

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Billion dollar electric utility corporation with centralized data center needs experienced Systems Programmers.

Positions offer unlimited growth potential within the rapidly expanding corporate Information Services Department. Present staff expanding to support installation of second CPU (3033).

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Opening as a result of promotion. Requires background in order entry and marketing systems, and project leadership experience. Degree and HP-3000 exposure desirable.

SR. SYSTEMS ANALYST

Assignments will include order entry, payroll and personnel systems. CICS exposure desirable.

All of these professional positions offer an excellent compensation package including semi-annual cash bonus, dental insurance and relocation assistance.

RESUMES MUST INCLUDE SALARY HISTORY AND REQUIREMENTS FOR CONSIDERATION.

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EASTERN NEW MEXICO UNIVERSITY

RESPONSIBILITIES: Develop, install, and administer Data Communication and Data Base hardware/software for all applications requiring such services. Assist in hardware/software planning and development of system software as directed by the Director of Technical Services.

QUALIFICATIONS: Bachelors degree in Business, computer science, Math or equivalent work experience, a minimum of five years of systems programming, thre years of Data Base/Data Communications, one year of management and broad experience in IBM hardware/software.

Send resume to:

James D. Brainard, Director
Computer Services
Eastern New Mexico University
Portales, New Mexico 88130

EASTERN NEW MEXICO UNIVERSITY IS AN AA/EEO EMPLOYER

MANAGER OF EDP SYSTEMS AND APPLICATIONS

Major Chicago based employer seeks individual presently Director or Assistant Director of MIS of a listed company. Should have substantial experience in feasibility studies, functional and systems planning, large and small systems implementation, and project management responsibilities. Should have good communications skills; will work often with CEO, CFO, and Board of Directors.

Will manage and direct MIS/EDP systems and applications development and implementation. Will be responsible for recruiting and training a well balanced staff of professionals, to serve in broad based industrial areas of application.

This is a management position, and requires marketing orientation, staffing and development abilities directed toward significant growth. Approximately 50% travel to varied locations is involved.

If there is no place for you to go in your current assignment, this may well be the excellent opportunity you need to continue fast track career growth.

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DATA PROCESSING OPPORTUNITIES

The concept of Dispersed Data Processing was born at Datapoint and through the combined efforts of our talented people, we've developed one of the most versatile computer families available. We're ahead of our competition even now and pioneering the concept of the Integrated Electronic Office that will support the office of the future.

We Understand Success... And We're Ready For More!

Sr. Systems Analyst

This individual must have BS in Computer Science or equivalent with at least 5 years programming experience. Responsibilities will include analyzing systems requirements with users, development of detailed specifications for systems including cost analysis and preparation of status reports. Logistics/inventory application experience an asset. This position offers excellent career potential with high visibility and heavy interaction with users and managers.

Programmer

This individual must have a BSCS or equivalent with at least one year programming experience. Knowledge of COBOL or BASIC is a plus. In this position you will write, test and implement new programs and modify existing programs for logistics and management systems applications.

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San Antonio offers the unique lifestyle of a metropolitan city without the congestion of a city that has grown too fast. Datapoint offers the excellent starting salaries with great benefits, and the kind of career growth that can only be offered by a company with revenues that have grown at a rate of 47% annually over the last five years.

For prompt confidential consideration, please send your resume, including salary history, to: Marianne Palacios, Datapoint Corporation, 9725 Datapoint Drive, Mail Station S-63, San Antonio, Texas 78284.

We are an equal opportunity employer M/F.

DATAPOINT

EDP Information For The Future

Let Arkwright-Boston assure your future NOW in Electronic Data Processing. We are leaders in the field of industrial insurance and loss prevention, underwriting property values totaling over $100 billion.

As part of Arkwright-Boston's commitment to the future, yours and ours, we offer you access to the new data processing technologies and methodologies of the 80's with these current openings:

Systems Group Supervisor

Direct and coordinate all analytical activities and perform specific projects' analytical responsibilities.

Good interpersonal relationship skills, 6-12 years' analytical and supervisory experience are required.

EDP Quality Assurance Analyst

Become part of our EDP Quality Assurance group which interfaces with our Structured EDP environment.

Involvement will include state-of-the-art development and implementation of EDP Review, Testing Techniques and Standards.

5-8 years' experience in Data Processing, 4 years of which have been in EDP Systems Analysis, are required.

Senior EDP Systems Programmer

Coordinate the installation and use of all Systems Software within our companies. Advise EDP groups in technical matters relating to hardware and/or Systems Software use. Develop standard software utilities for general in-house use.

Knowledge of IBM DOS/VS internals, 370 Assembler language, system generation procedures and error detection/correction techniques required. 3-8 years' systems programming experience necessary. Basic understanding of Data Base and Telecommunications helpful. This position reports to Manager of Systems and Software Services.

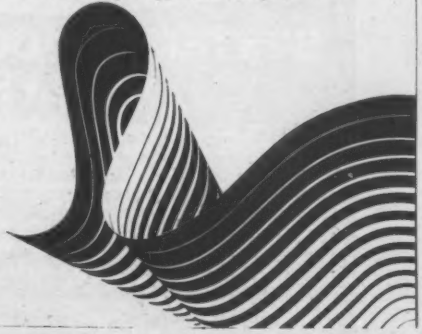
EDP Senior Designer

Perform all assignments related to the design of data processing solutions to business problems. Supervise daily activities of 4 designers.

3-8 years' computer system design experience required and/or B.S. degree in Computer Science.

Respond with resume to Ms. Frances Eaton, Arkwright-Boston Insurance, 225 Wyman Street, Waltham, Massachusetts 02154. We are an equal opportunity employer m/f.

ARKWRIGHT-BOSTON INSURANCE



ADMINISTRATIVE SYSTEMS COMPUTER ANALYSTS

The State University of New York at Binghamton is accepting applications for 2 positions in the administrative Information Systems area. The Computer Center utilizes a NASCO AS/6 operating under OS/VS-1. CICS and 3270 technology are utilized to support on-line Administrative applications.

PROGRAMMER/ANALYST

This position requires a minimum of two years experience in COBOL applications programming. The individual in this position will be responsible for programming in support of administrative applications.

TECHNICAL SUPPORT ANALYST

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Closing Date: May 15th, 1980

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Minimum requirement MBA or other relevant Masters, as well as applicable experience. Ph.D. and degree in Computer Science preferred. Must be ready to teach programming languages (COBOL, PL/1, SAL, etc.) as well as advanced courses in information systems design, D.P. Management, telecommunications, etc. Must be able to contribute to continued development of expanding, dynamic undergraduate program.

Northeastern is located on the north side of Chicago, one of the world's great industrial and financial centers. Outside professional contact is encouraged.

Letters of application accompanied by detailed resumes should be received no later than April 30, 1980 by

Prof. Louis Becker, Chairperson
Faculty Search committee
Department of Information Science
Northeastern Illinois University
Chicago, Illinois 60625.

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DATA PROCESSING OPPORTUNITIES
HARRIS CORPORATION
DALLAS, TEXAS

QUALITY ASSURANCE ANALYSTS
(Lead Programmer)

QUALIFICATIONS: BS Computer Science or Business and 5-10 years experience in a medium to large scale IBM OS environment. Assertive individual with strong communication skills is necessary. Minimum of 2-4 years Project Management experience and strong technical background in COBOL. Experience in structured programming, data base (IDMS preferred) and data communications a plus!

RESPONSIBILITIES: Review and approval of all new and revised systems to be placed in production, systems acceptance testing, enforcement of established standards, recommendation of new or revised standards, and post implementation audits.

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QUALIFICATIONS: 1-4 years experience with IBM assembly language, JCL, utilities and dumps. Experience with IBM OS or VS operating system, generation and maintenance. Generation and maintenance of 3705 software and knowledge of internals helpful. Degree preferred.

RESPONSIBILITIES: Generate and maintain IBM VS1 operating system on IBM 370/148, RTAM, and associated program products. Generate and maintain software for 3705 (NCP, PEP, VTAM). Perform system performance measurement and tuning and capacity planning.

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QUALIFICATIONS: BS Computer Science or Business and 5-10 years experience in COBOL programming on IBM OS/VS1 OS. Data Base Management, structured systems analysis and design of financial or marketing systems are necessary.

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data processing

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Chicago	(312) 641-3040	Pittsburgh	(412) 261-4654
Cleveland	(216) 476-0945	Salt Lake City	(801) 364-6783
Dallas	(214) 559-3260	San Antonio	(512) 224-5339
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The Old National Bank of Washington, headquartered in Spokane is accepting applications for a Software Programmer to work in a technical support area. This person will assist in maintaining CICS/VS, ACF/VTAM running under VS1. Working knowledge of CICS is a must and VTAM is helpful. Applicants must be proficient in ALC, OS, JCL and utilities. Salary will be commensurate with experience. An outstanding benefit package is offered. Send resume to: **Old National Bank, P.O. Box 3588 TA, Spokane, WA 99220, (509) 488-2188.** We are an equal opportunity employer.

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PROGRAMMER ANALYSTS
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and
Programmer Analyst

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NATIONAL Bank of Alaska

Programmer Analyst

Two or more years' experience on IBM 370 OS Systems with strong ASSEMBLER and OS JCL. Background in CICS and interactive programming is highly desirable.

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EOE/MF

ARIZONA STATE UNIVERSITY
SCIENTIFIC PROGRAMMER I/II

Under general supervision, these positions will be responsible for providing assistance to academic computer users. This assistance includes consulting advice to specific areas of instructional or research use. Typical duties and responsibilities include writing documentation; writing software routines that will assist users in solving their computational needs; debugging programs and testing results for correctness. Also assisting computer users in analyzing problems in terms of detailed equipment requirements and capabilities and the use of library programs. Will prepare program reports or may design user's manuals for large application programs and perform related duties as required, such as contributing to departmental publications and presenting short courses to computer users. The scientific programmer I position will have some project leadership responsibilities; the scientific programmer II position will have extensive project leadership and supervisory responsibilities. Both positions have considerable latitude for independent judgement.

A Bachelor's Degree in a computer related field is required. Master's preferred. Three years computer programming experience required for the scientific programmer II position; one year for the scientific programmer I. This experience should be preferably on a large scale system with time sharing capabilities. Knowledge must include the principles, methods, and procedures for computer program development and design. Knowledge of FORTRAN and several other major programming languages is required. IBM OS/VS and PDP-11 RSTS a/s both desirable.

Application period ends 25/Apr/80. Submit application to Arizona State University, Personnel Department, Tempe, Arizona, 85281. Equal Opportunity/Affirmative Action Employer.

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Information Systems Dept.
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Formulate product strategies for our new transaction processing RELIANCE commercial software; propose new product capabilities; monitor implementations; manage product introductions and field staff training; maintain competitive awareness. Your goal is to aggressively expand our presence in the high performance transaction processing market. The successful candidate will have proven leadership and communications skills; a technical degree and/or MBA; 10 years experience of commercial system and application software, including 3 years Marketing experience.

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Formulate product strategies for our next generation of processor products; propose new product family members; monitor implementations; manage field staff training; monitor manufacturing operations; maintain competitive awareness. Your goal is to assure our continued leadership in the field of high performance super-minis. Successful candidates will be proven leaders and good communicators with a technical degree and/or MBA; 10 years of computer systems experience including 2 years experience in marketing industrial hardware products.

PRODUCT SPECIALIST— COMMERCIAL SOFTWARE

Introduce and promote new products; evaluate product performance; establish measurement criteria; maintain competitive analyses; develop promotional and internal training materials for our commercial software products. The successful candidate will have proven communications skills, a technical degree and five years experience of commercial system and application software. Sales or Marketing exposure an advantage.

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Characterize computer systems products; identify competitive offerings; analyze comparative strengths and weaknesses; monitor industry trends. Your objective is to sharpen the competitive awareness of our marketing organization for its planning and promotional activities. The successful candidate will be a good communicator with an analytical mind. Technical degree and 5 years experience in a computer industry are required. Sales/marketing exposure an advantage.

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State University College
Oneonta, New York 13820

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Five years experience in program analysis including two years of systems analysis and design responsibility is required along with appropriate B.A. degree. Additional experience may substitute for the B.A. A strong candidate will have D.P. Management experience. Must have good problem solving and communication skills and be willing to program. Applicant should have a knowledge of Basic Plus, Basic Plus 2 and RSTS/E.

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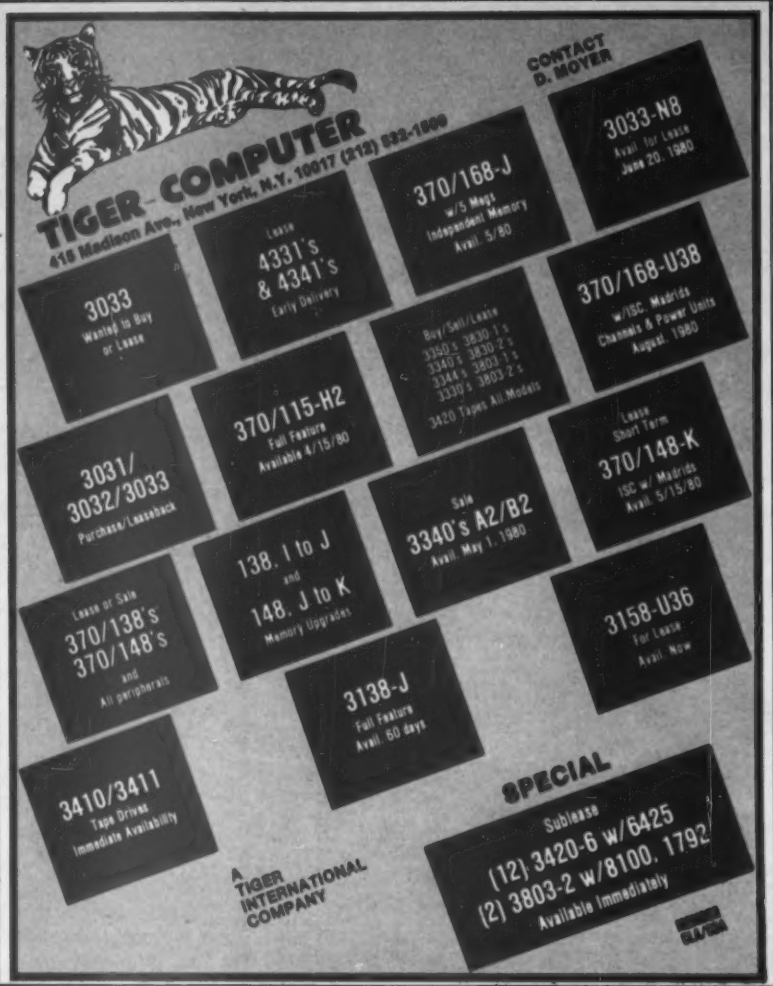

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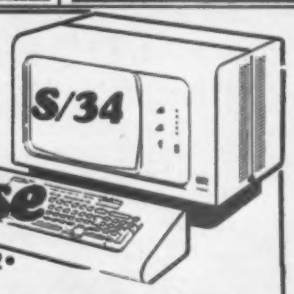

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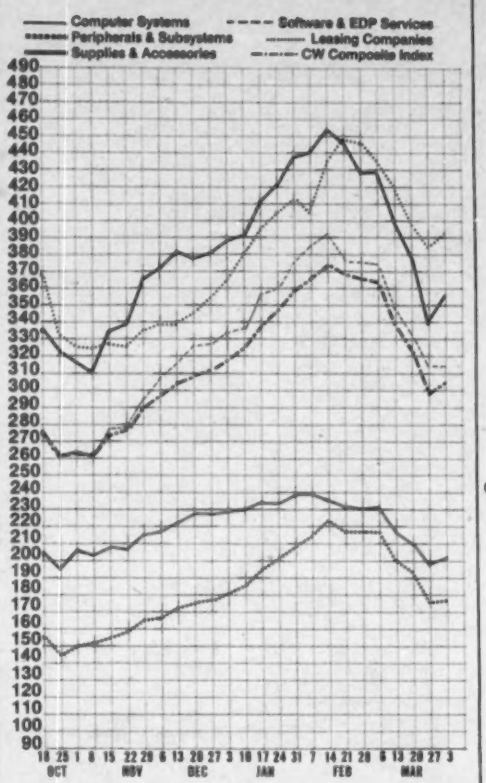

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TRADE*QUOTES

Computerworld Stock Trading Summary

CLOSING PRICES WEDNESDAY, APRIL 2, 1980

All statistics compiled, computed and formatted by TRADE QUOTES, INC. Cambridge, Mass. 02139

E X C H		1979-80 RANGE (1)	CLOSE APR 2 1980	WEEK NET CHNGE	WEEK PCT CHNGE
	COMPUTER SYSTEMS				
A	AMDAHL CORP	10- 59	21 3/8	+3 7/8	+22.1
N	BURROUGHS CORP	59- 87	67 1/4	+3 3/4	+5.9
O	COMPUTER AUTOMATION	9- 44	15	+2	+15.3
N	CONTROL DATA CORP	23- 61	48	+3 1/2	+7.8
O	CRAY RESEARCH INC	8- 58	42 3/4	+1 3/4	+4.2
N	DATA GENERAL CORP	42- 74	58 3/8	+ 3/8	+0.6
N	DATAPOINT CORP	34-123	104 1/2	+6 1/2	+6.6
N	DIGITAL EQUIPMENT	39- 80	64 1/2	+5 1/4	+8.8
N	ELECTRONIC ASSOC.	2- 13	7	- 1/8	-1.7
A	ELECTRONIC ENGINEER.	9- 19	12	-1 1/8	-8.5
N	FOUR-PHASE SYSTEMS	19- 47	27 5/8	- 7/8	-3.0
N	FOXBORO	28- 44	32 3/4	+ 3/4	+2.3
O	GENERAL AUTOMATION	7- 26	10	-1 1/4	-11.1
O	GRI COMPUTER CORP	1- 3	5/8	+ 1/8	+25.0
N	HEWLETT-PACKARD CO	20- 70	62 3/8	+2 1/2	+4.1
N	HONEYWELL INC	43-100	72 3/4	+ 3/4	+1.0
N	IBM	53-321	55 1/2	+2 1/2	+4.7
N	MANAGEMENT ASSIST	9- 29	11 1/4	- 3/8	-3.2
O	MANUFACTURING DATA S	9- 38	30	+1 3/4	+6.1
O	MINI-COMPUTER SYST	2- 8	2 1/2	- 1/8	-4.7
O	MODULAR COMPUTER SYS	7- 18	11 1/2	+1 1/4	+12.1
N	NCR	37- 81	58	+1 1/2	+2.6
N	PRIME COMPUTER INC	9- 38	24 1/4	+ 5/8	+2.6
N	PERKIN-ELMER	17- 47	39 3/8	+2 1/4	+6.0
N	SPERRY RAND	33- 60	46 5/8	- 3/8	-0.7
A	SYSTEMS ENG. LABS	11- 24	15 1/8	+1 1/8	+8.0
O	TANDEM COMPUTERS INC	13- 54	47	+8 1/4	+21.2
N	TEXAS INSTRUMENTS	78-158	83	+ 5/8	+0.7
A	WANG LABS.	9- 40	32 3/4	+3 3/8	+11.4
	LEASING COMPANIES				
O	BOOTHE FINANCIAL CP	13- 21	14 1/4	-1 1/4	-8.0
O	COMDISCO INC	3- 21	9	+2	+28.5
A	COMMERCE GROUP CORP	1- 2	2 1/8	- 1/2	-19.0
A	COMPUTER INVSTRS GRP	1- 7	2 1/4	+ 1/8	+5.8
O	CONTINENTAL INFO SYS	2- 15	2 1/4	- 1/4	-10.0
N	DATRONIC RENTAL	1- 4	2 1/2	+ 1/8	+5.2
A	DGL INC	3- 6	5 1/4	0	0.0
N	DPF INC	5- 14	5 3/8	- 3/8	-6.5
N	ITEL	2- 36	2 3/8	+ 1/4	+11.7
N	LEASCO CORP	24- 73	64	+1 1/4	+1.9
O	LEASPAC CORP	1- 4	1/8	0	0.0
A	PIONEER TEA CORP	2- 7	3	+ 3/8	+14.2
N	U.S. LEASING	12- 28	13 1/8	+ 5/8	+5.0

E X C H		1979-80 RANGE (1)	CLOSE APR 2 1980	WEEK NET CHGE	WEEK PCT CHNGE
	SOFTWARE & EDP SERVICES				
O	ADVANCED COMP TECH	1- 2	2 3/8	+ 1/8	+5.5
O	ANACOMP INC	8- 24	12	- 1/4	-2.0
O	ANALYSTS INTL CORP	3- 6	4 1/4	0	0.0
A	APPLIED DATA RES.	7- 17	8 5/8	- 1/8	-1.4
N	AUTOMATIC DATA PROC	24- 40	36 1/4	+2 1/4	+6.6
O	COMPU-SERV NETWORK	5- 19	17	- 1/4	-1.4
O	COMPUTER HORIZONS	1- 9	3	- 1/2	-14.2
O	COMPUTER NETWORK	4- 16	4 3/8	+ 1/8	+2.9
N	COMPUTER SCIENCES	8- 24	18 3/8	+1 1/2	+8.8
O	COMPUTER TASK GROUP	1- 9	5 3/4	-1 1/2	-20.6
O	COMPUTEN USAGE	2- 5	3 3/4	+ 3/4	+25.0
O	COMPUT AUTO REP SVC	4- 10	4 7/8	- 1/8	-2.5
O	COMSHARE	8- 26	13 1/4	- 3/4	-5.3
O	CULLINANE CORP	14- 34	26	0	0.0
O	DATA DIMENSIONS INC	1- 9	1 3/8	+ 1/8	+10.0
O	DATATAB	1- 4	5/8	0	0.0
O	DSI CORP	1- 9	5 1/4	-1	-16.0
N	ELECTRONIC DATA SYST	15- 28	28 1/2	+ 1/4	+1.2
O	INFORMATICS INC	9- 22	13 1/4	+ 3/4	+6.0
O	INSYTE CORP	1- 3	1 1/2	+ 1/8	+9.0
O	IPS COMPUTER MARKET.	2- 4	3 1/4	+ 1/4	+8.3
O	KEANE ASSOCIATES	3- 9	7 1/4	- 3/4	-9.3
O	KEYDATA CORP	1- 5	2 1/4	+ 1/8	+5.8
A	LOGICON	10- 23	17 1/8	0	0.0
O	NATIONAL DATA CORP	7- 19	14 3/4	- 1/2	-3.2
N	PLANNING RESEARCH	4- 10	5 7/8	+ 1/8	+2.1
O	PROGRAMMED TAX SYSTS	3- 5	4 1/2	0	0.0
O	PROGRAMMING & SYS	1- 1	3/4	0	0.0
O	RAPIDATA INC	3- 7	4 1/8	- 1/8	-2.9
O	REYNOLDS & REYNOLD	18- 36	27	+ 1/4	+0.9
O	SCIENTIFIC COMPUTERS	3- 16	11 1/4	0	0.0
N	TYMSHARE INC	18- 58	44 7/8	0	0.0
A	URS SYSTEMS	5- 12	9	-1	-10.0
N	WYLY CORP	1- 9	7 3/4	+ 1/8	+1.6
	PERIPHERALS & SUBSYSTEMS				
N	AM INTERNATIONAL	13- 32	15 1/8	- 7/8	-5.4
N	AMPEX CORP	18- 89	23 3/4	+1	+4.3
A	ANDERSON JACOBSON	5- 16	11 3/4	+1 3/4	+17.5
N	APPLIED DIG DATA SYS	5- 22	6	+ 1/8	+2.1
O	AUTO-TROL TECHNOLOGY	14- 39	28	-1	-3.4
O	AMEMIVE INTL	3- 8	5 5/8	+ 3/8	+7.1
A	BOLT+BERANEK & NEW	6- 22	15 1/2	+ 1/8	+0.8
N	BUNKER-RAMO	10- 32	22	+1 3/8	+6.6
O	CAMBRIDGE MEMORIES	1- 8	1 5/8	8	0.0
O	COMPUTER DEVICES INC	5- 9	6 1/2	+1	+18.1
N	CENTRONICS DATA COMP	10- 54	24 1/2	+ 5/8	+2.6
O	COGNITRONICS	1- 4	2 3/8	- 1/8	-5.0
O	COMPUTER COMMUN.	4- 18	4 1/2	+ 7/8	+24.1
O	COMPUTER CONSOLES	4- 24	12 3/4	-8 3/4	-40.6
A	COMPUTER EQUIPMENT	3- 7	5 1/4	- 1/8	-2.3
O	COMPUTER TRANSCEIVER	1- 5	2 1/4	- 1/8	-5.2
O	COMPUTERVISION CORP	5- 58	48 7/8	+8 1/2	+15.3
N	CONRAC CORP	13- 26	16	- 1/8	-0.7
A	DATA ACCESS SYSTEMS	0- 14	10 1/8	+ 5/8	+6.5
A	DATA PRODUCTS CORP	12- 25	12 3/4	- 1/8	-0.9
O	DATUM INC	2- 6	2	- 1/4	-11.1
O	DECISION DATA COMPUT	2- 6	2	- 1/4	+14.2
O	DELTA DATA SYSTEMS	1- 3	1 3/4	- 3/8	-17.6
N	DOCUMATION INC	0- 34	9 3/8	+ 3/4	+8.6
O	DATARAM CORP	0- 36	32	+ 1/4	+0.7
N	ELECTRONIC M & M	3- 9	4 1/8	0	0.0
O	EVANS & SUTHERLAND	20- 52	42	-4 1/2	-9.6
O	FABRI-TEK	1- 2	1 5/8	- 1/4	-13.3
O	GENERAL COMPUTER SYS	1- 3	2 1/8	+ 1/4	+25.0
O	GENERAL DATACOMM IND	9- 24	14 3/4	+1 3/4	+13.4
N	HAZELTINE CORP	10- 29	21 1/2	+1 1/8	+5.5
N	HARRIS CORP	17- 39	31 1/4	+1 3/8	+4.6
O	INFOREX INC	1- 11	1 1/2	+ 1/8	+9.0
O	INFORMATION INTL INC	7- 15	11 1/2	+1	+9.5
O	INFOTON	1- 4	2 1/2	+ 1/8	+5.2
O	INTEL CORP	20- 75	62 1/2	+3	+5.0
O	INTERSIL	7- 32	18 3/8	+1	+5.7
A	LUNDY ELECTRONICS	6- 11	8 3/4	+ 7/8	+11.1
O	MSI DATA CORP	5- 19	6 5/8	+ 5/8	+10.4
N	MEMOREX	11- 99	13	+1 7/8	+16.8
N	MOHAWK DATA SCI	9- 28	14 1/4	+1 1/2	+11.7
O	OMEX	2- 10	10	0	0.0
O	PARADYNE CORP	9- 36	24	-3 1/4	-11.9
A	PENRIL CORP	5- 15	9 3/4	+ 1/4	+2.6
A	POTTER INSTRUMENT	2- 2	1 3/4	0	0.0
O	RANTEK CORP	7- 17	12 1/4	- 1/2	-3.9
O	RECOGNITION EQUIP	5- 13	8	- 1/8	-2.0
O	SCAN DATA	1- 5	1 5/8	- 1/8	-7.1
N	STORAGE TECHNOLOGY	13- 46	14 3/4	+1 1/8	+8.2
O	SYKES DATATRONICS	4- 31	18 3/4	+1	+5.6
O	T BAR INC	11- 28	22 1/2	+2 1/4	+11.1
A	TEC INC	4- 13	3 5/8	- 1/4	-6.4
N	TEKTRONIX INC	33- 64	49 1/2	+3 5/8	+7.9
N	TELEX	3- 9	3 1/8	+ 1/8	+4.1
O	TESDATA SYSTEMS CP	8- 26	10 1/8	0	0.0
O	TIMEPLEX INC	4- 14	10 1/8	+ 1/8	+1.2
O	WILTEK INC	1- 2	7/8	- 1/2	-36.3
	SUPPLIES & ACCESSORIES				
A	AMERICAN BUS PRODS	0- 12	8 3/4	+ 3/4	+9.3
O	BALTIMORE BUS FORMS	1- 4	3/4	0	0.0
N	BARRY WRIGHT	14- 34	23 3/4	+2 3/8	+11.1
O	CYBERNATICS INC	1- 1	7/8	0	0.0
O	DUPLEX PRODUCTS INC	13- 31	23 3/8	+ 5/8	+2.7
N	ENNIS BUS. FORMS	5- 21	13 1/2	-1	-6.8
N	3M COMPANY	43- 66	58	+2 3/8	+4.9
O	MOORE CORP LTD	20- 34	28	+ 3/4	+2.7
N	NASHUA CORP	18- 37	22 3/4	+1 5/8	+7.6
O	STANDARD REGISTER	20- 29	23	- 1/2	-2.1
A	TAB PRODUCTS CO	8- 22	16 3/4	- 3/8	-2.1
A	WABASH MAGNETICS	10- 22	12 1/8	+ 1/8	+1.0
N	WALLACE BUS FORMS	18- 33	24 1/2	- 1/8	-0.5

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